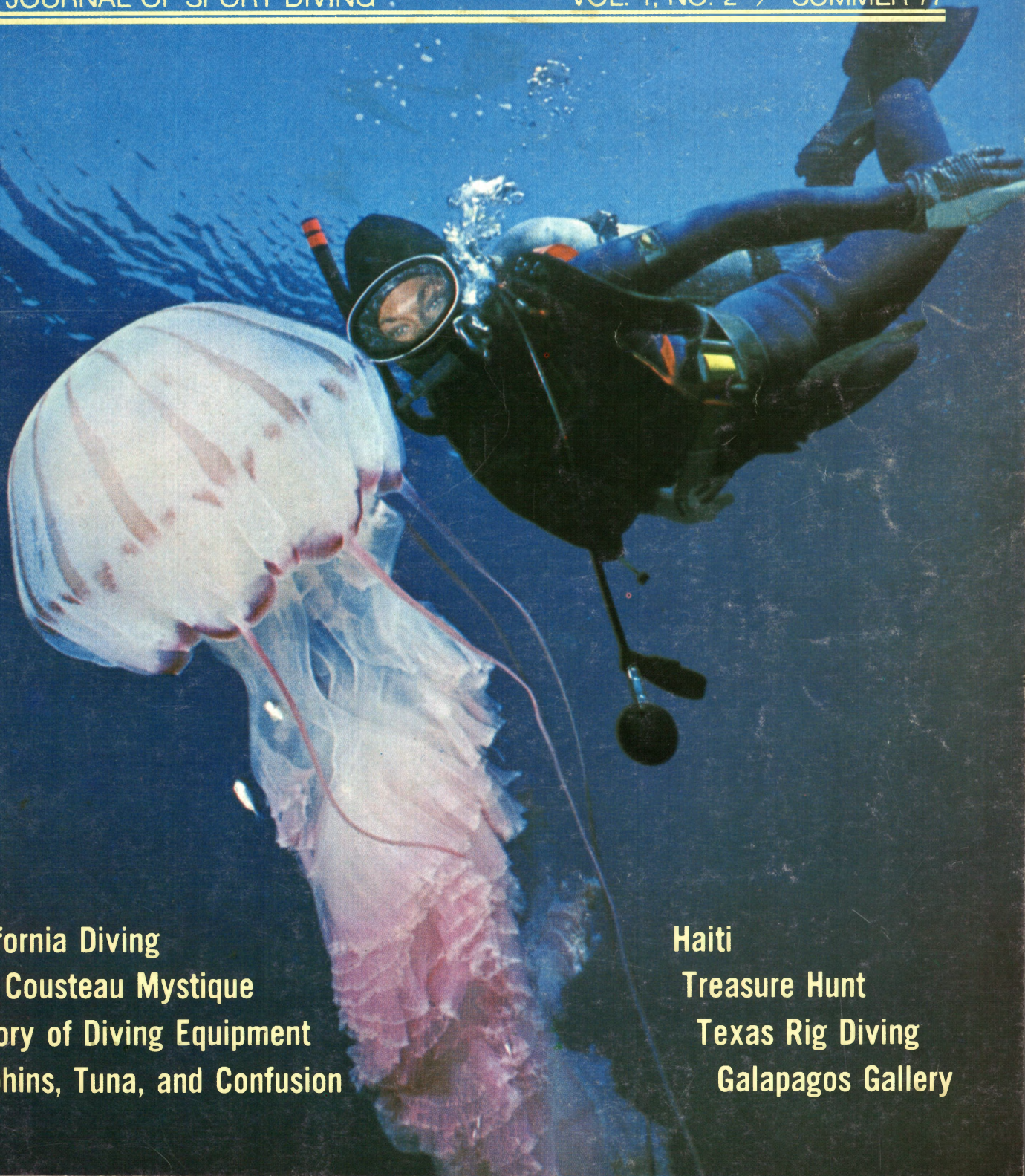


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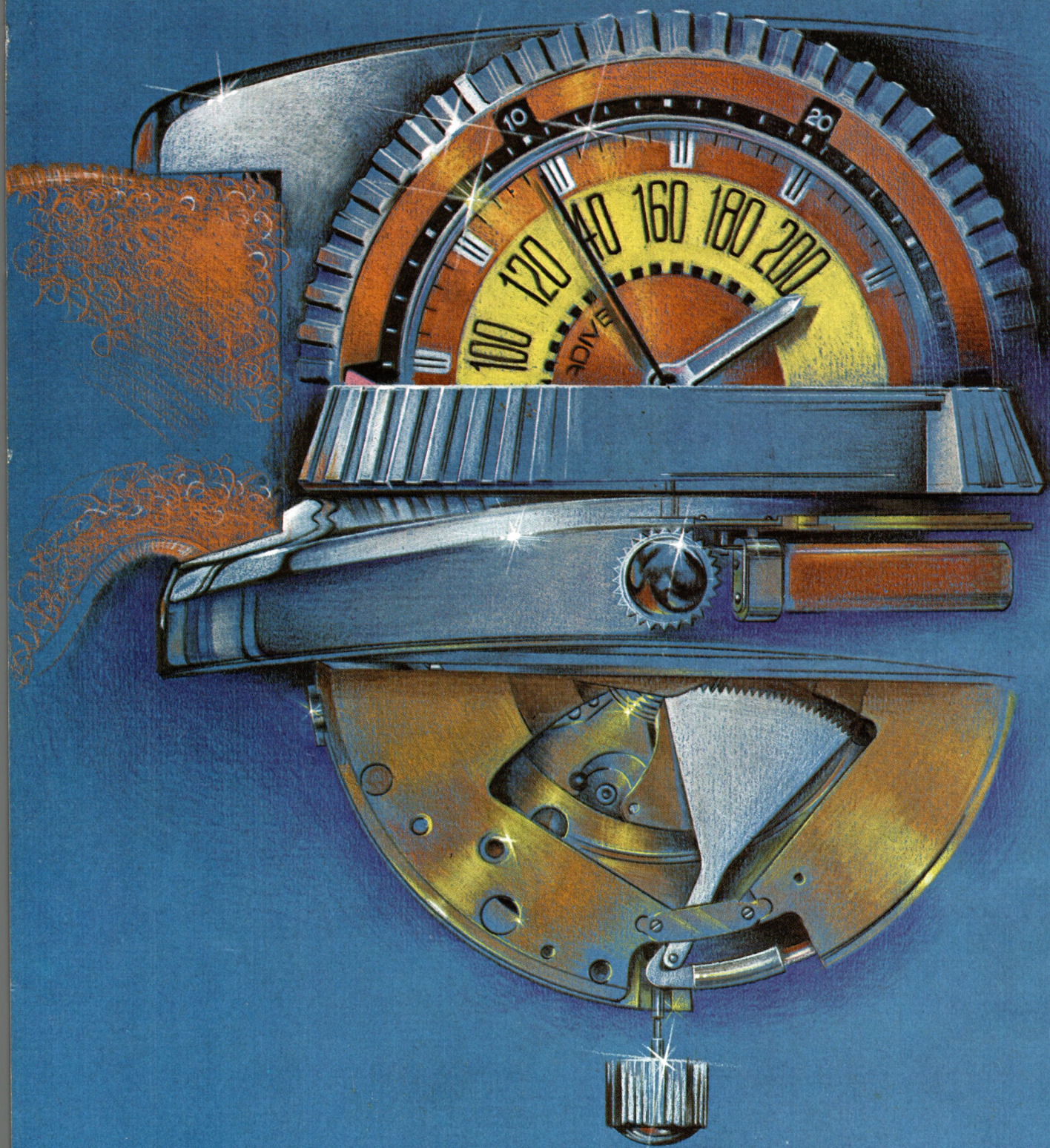
THE JOURNAL OF SPORT DIVING

VOL. 1, NO. 2 / SUMMER 77



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Sport Diver

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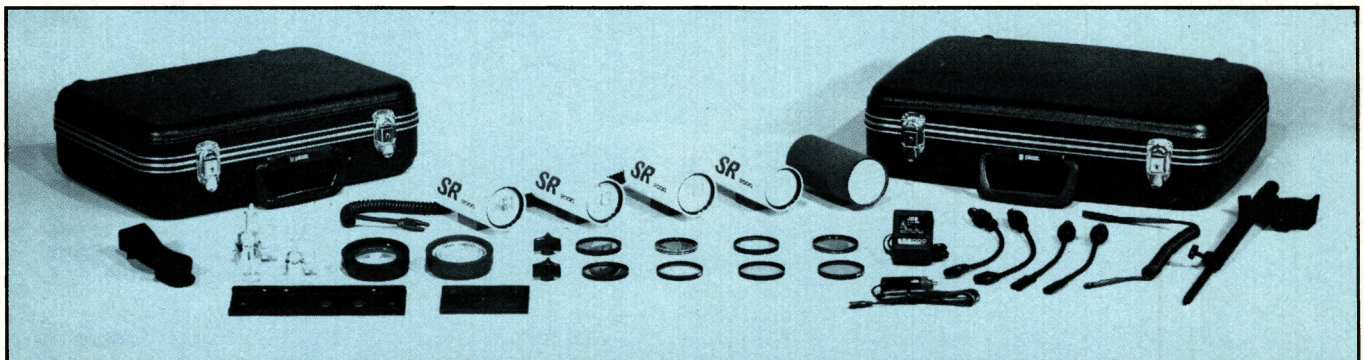


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Photography by Richard H. Stewart

Editorial

FROM THE PUBLISHER

As expected, the first issue of Sport Diver created quite a wave of excitement throughout the diving community. Dive shops reported sell-outs of their initial stock within three to four days, and our mailman began using a larger bag to handle our increasing subscriptions. Although we hadn't expected or directed much attention outside of the U.S., orders came from all around the world: Canada, Mexico, Holland, Germany, France, Italy, England, Sweden, Denmark, Australia, New Zealand, Fiji Islands, Philippines, Thailand and back to the Caribbean. All of us on the Sport Diver staff have been extremely happy with the way divers around the world have responded and wish to thank you, our readers, for giving us your support. With that, you can rest assured we will continue trying our best to entertain, excite, and inform you through the use of color photography, creative design and quality printing.

Our mail has shown a considerable amount of requests concerning our editorial policy. I guess that could best be described as, the feelings of our readers, as well as our own. Most pressing is the preservation of the sea. We are all faced with the multiplying problems of pollution, oil exploration and underwater strip mining. Admittedly, these projects could be disastrous to the oceans, but the existence of our children's energy needs run parallel with this problem. Hopefully our editorials will bring about an awareness which could ultimately lead to a compromise. The rapidly approaching extinction of the oceans' international protection laws, is also on top of our list. international protection laws, are also top on our list.

Requests for more local U.S. coverage has prompted us to maintain a near-equal balance of reportive stories for both the local and international scene. Controversial subjects will be

reviewed and explained in our continuous series called "Controversea" as an attempt to prompt divers from around the globe to respond with their views. We *will* publish articles concerning such "hushed" subjects as, cave diving, spearfishing, deep diving, tropical fish collecting and a multitude of others. Exposure will help turn the current trend of anti-education and create a better understanding.

There is a definite movement in our industry toward underwater photography. Vivid, exciting, sensual, educational, the preservation of today for tomorrow: these are some of the aspects of photography. No amount of words can contain or define a photograph; the image speaks for itself in its own language. We hope you'll enjoy this issue with its unique visual experiences and corresponding articles, and become a regular follower of the exciting movement called *sport diving*.

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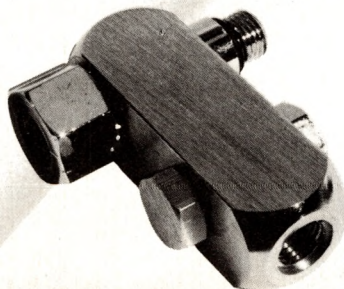
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Print size shall be a minimum of 3½x4½ inches, maximum of 8x10 inches, glossy finish and mounted on an 8x10 inch mount board. Entrants name, address and print title must appear on the back of each board.

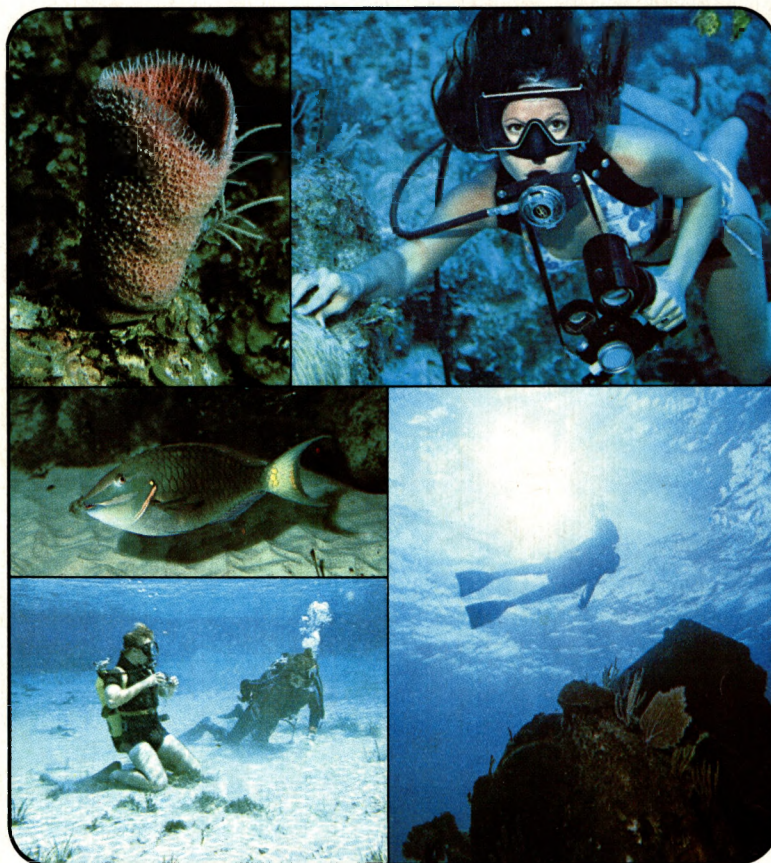
Slides must be 2x2 inches mounted and inserted in plastic storage protectors with the entrant's name, address and title.

Movies must be 8mm, super 8, or 16 mm with or without sound, 15 minutes or less, with 75% or more exposed underwater and containing entrants name, address and the film title marked on the container and film leader.

All possible care will be exercised, but no responsibility will be assumed by SPORT DIVER MAGAZINE or UPIA for the loss or damage of entries.

Judging shall be done by the photo competition committee using a basic point system on technique, composition, color, quality and story. Decision of the committee will be final.

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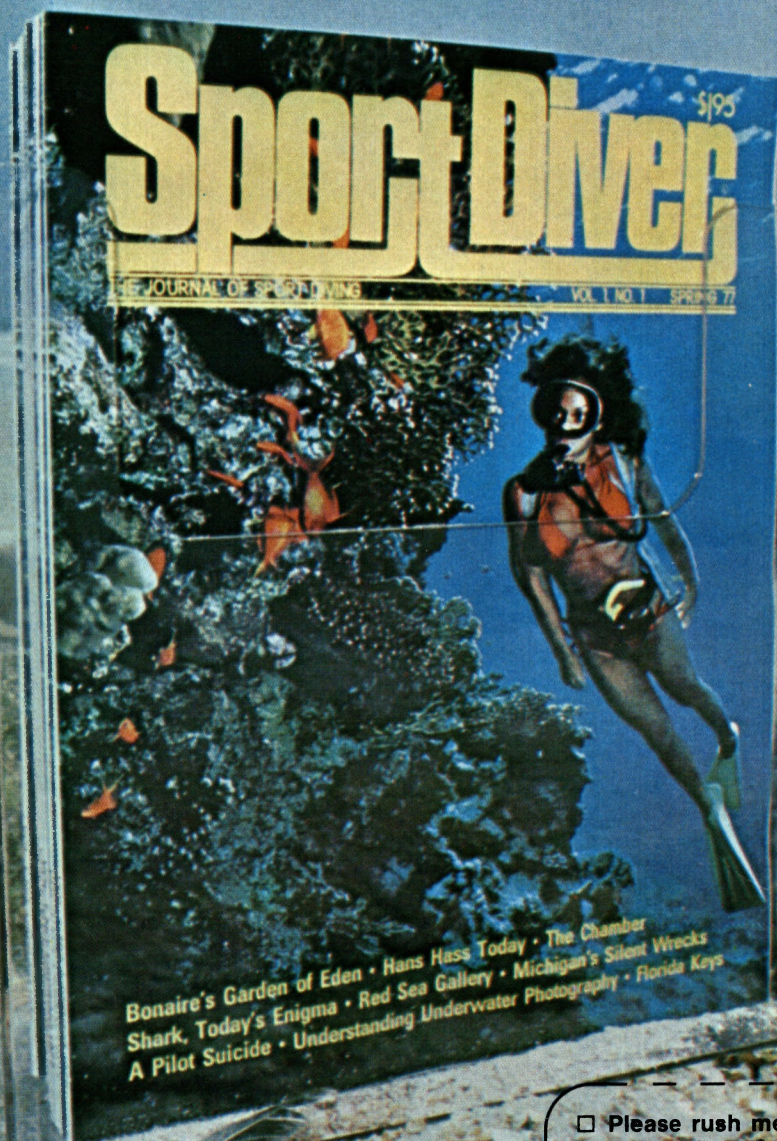
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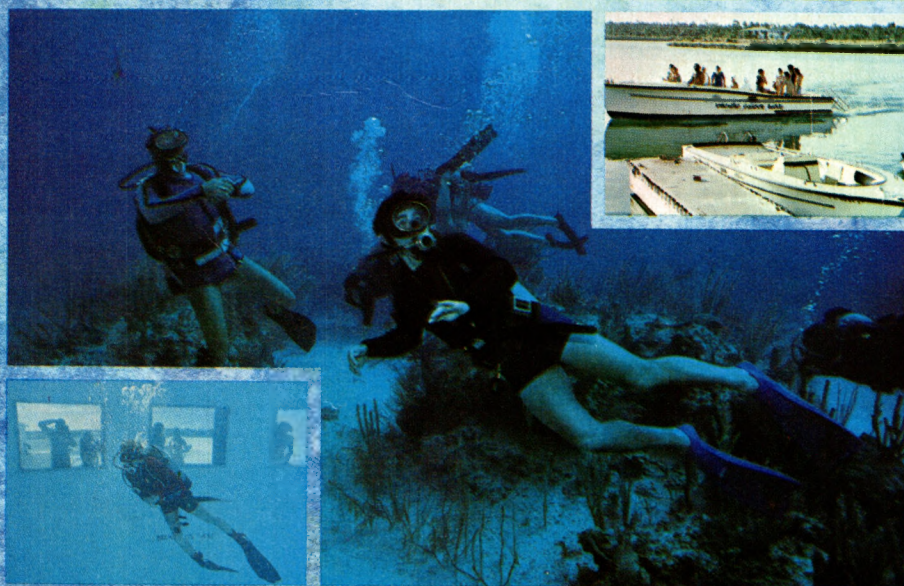


RICHARD H. STEWART



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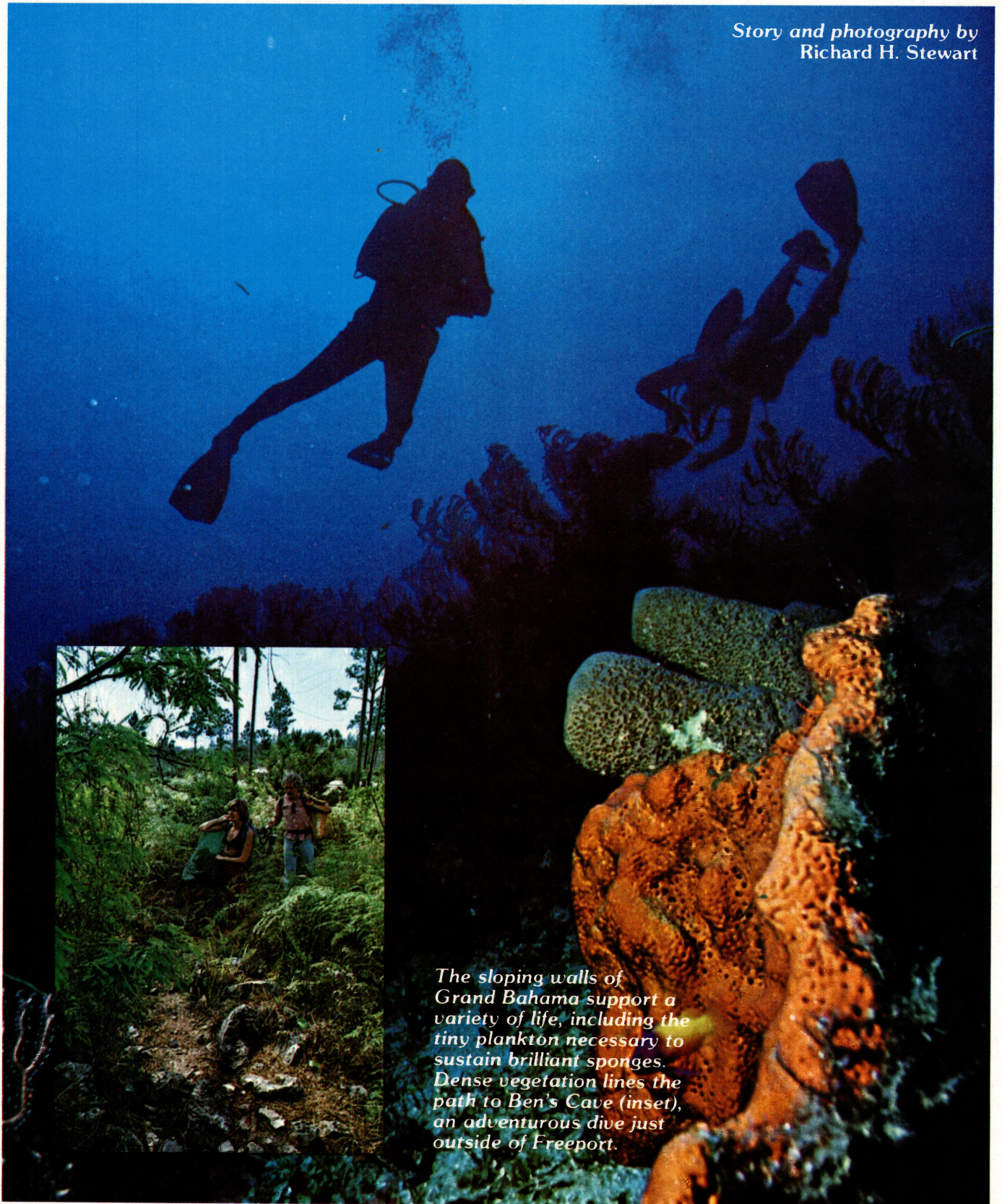
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FREEPORT

*Story and photography by
Richard H. Stewart*



The sloping walls of Grand Bahama support a variety of life, including the tiny plankton necessary to sustain brilliant sponges. Dense vegetation lines the path to Ben's Cave (inset), an adventurous dive just outside of Freeport.

& NASSAU



The relaxed atmosphere at the Pilon's House Hotel is perfect for getting away, or just getting into some recreation. Bahama Divers' shop is located at the hotel and their daily excursions originate from there.



Imagine deep blue and emerald green waters speckled with white-beached islands, where the days are filled with excellent diving and the setting sun brings only the sound of the wind combing the swaying palm trees. For many, this is the type of getaway vacation planned for that once-a-year, seven-to-ten day leave of absence. One increasingly popular trend is the short 3 night/4 day "second vacation", with its lower, more affordable price. By taking advantage of the airlines' many direct-flight excursion rates, the cost of traveling to the Bahamas can be cut considerably if you're flying from the west or northeast coasts. For travelers from the Southeast, low fares are available from Mackey Airlines and Bahamasair.

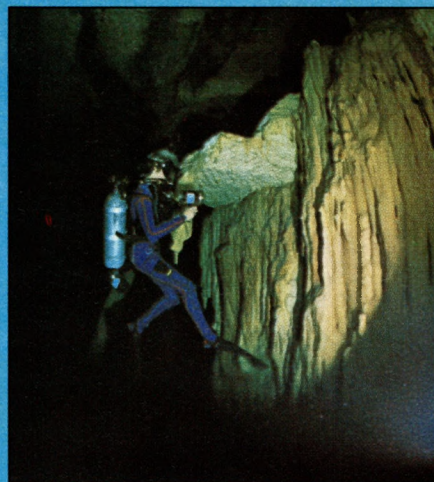
The two major islands, Grand Bahamas and New Providence both have dive facilities which offer "long weekend" excursions and both have all the conveniences of home plus some — great restaurants, dance clubs, island traditions, a variety of diving, and of course, the casinos. The main Bahama islands are ideal for the professional person who wants to take a foreign excursion, yet needs to maintain constant communication with the office. The main islands are also perfect for those who wish to delve into the country's history, or those who just want to exploit their incredible combination of fun and sun.

Sport Diver

The Underwater Explorers Club is located in Freeport, the only major city on Grand Bahamas. Divers from all over the world come to use the Club's unique facilities, and many of those are such internationally known figures as the Cousteaus, Jack McKenney, and Bates Littlehales.

Established in 1966, the Club enjoys an amazing popularity which can be attributed to its unique facilities. There's a personable staff of certified instructors whose first priority is meeting the demands of the diving customer, a pro dive shop with a great selection of gear, an 18-foot-deep training tank, the Cousteau Museum of early diving and photographic equipment, a photo lab, and a research library.

For non-certified visitors, the Club offers a complete sport diving certification course taught by their own highly skilled staff of instructors. Unlike many resort

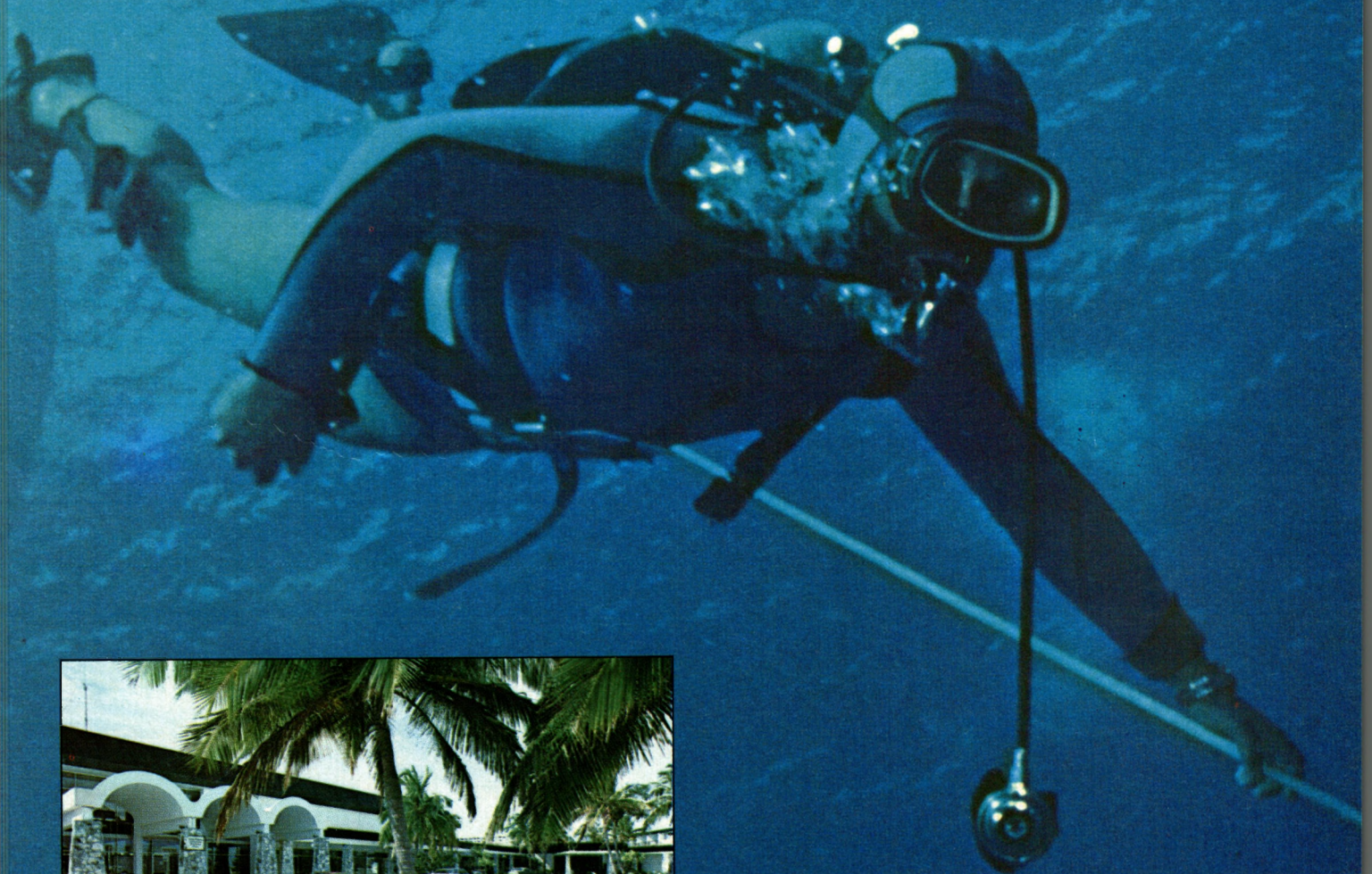


Photograph by John Larsen





The entrance to Ben's Cave (opposite page, upper left) is reached by climbing down a ladder. Once inside, the diver is confronted by huge stalactites, some eight feet or more in diameter. Shipwrecks near Freeport are a mecca for both fish and divers (opposite lower left) as are the beds of elkhorn coral (right). The Lucayan Bay Hotel (above) and UNEXSO (left) offer the unusual combination of excellent accommodations and superb diving facilities. The large French Angel (below) is one of the superb specimens found off Grand Bahama.





courses, the Club's deep tank allows the instructors to train students in a controlled deep water situation in preparation for their own open water diving. The Club also offers several special interest courses like advanced open water training, decompression diving (NAUI-PADI), blue hole diving, hyperbaric medicine, and underwater photography.

To transport divers to the various dive sites, the Club uses two custom-built Prowler dive boats, a 36 foot and a 23 footer. The most exciting sites are within five minutes of the Club's dock, so you spend less time getting there and more time in the water. In addition to the dozen or so bottom sites, there are a limited number of wall dives for those with advanced certification. The wall, which drops deep into the Northwest



Providence Channel, starts at just over 100 feet, and harbors the same variety of marine life found throughout the Bahamas. It's not quite as lush here as around many of the out islands, but there's enough to satisfy even the jaded appetite of a world traveling diver. In some areas of the wall it's not uncommon to find large Nassau Grouper following you so closely that you can't even take their picture!

If the ocean diving pales, then a trip to some of the numerous blue holes nearby should spark your interest. In particular, Ben's Cave will capture your imagination as you swim through its wide entrance and into the huge cavern filled with stalactites. Numerous labyrinthine tunnels branch off of the main cavern, but penetration of these is forbidden to all but those





who are highly trained cave divers.

It's true that diving in the waters off Freeport isn't the same as diving around Stella Maris; but then Stella Maris and most of the other out islands don't have the enjoyable combination of good diving, super facilities, and action-packed entertainment.

About 140 miles south-southeast of Freeport is the island of New Providence. Unlike the more contemporary city of Freeport, the island's major city, Nassau, is richly endowed with historic edifices and traditions. One of the earliest settlements of the Bahamas, Nassau, then known as Charles Town, experienced gracious periods of wealth and prosperity as well as tragic times of near annihilation. Initially occupied as a Spanish territory and then settled by the British, the



city became a major supply port for the gold-laden Spanish Plate Fleets sailing from Central and South America. As the importance of the port increased so did the size of the town and its population, and an imposing coral sand-stone fortress was constructed to protect the port — its walls crowded with innumerable batteries of cannons.

Nassau has changed little in the centuries since it was founded. The fort still broodingly presides over a harbor filled to capacity with sailing vessels. Many of the city's historic buildings are still standing, and the customs and traditions of the people are much the same as they were in the days when a cutlass was a man's best friend.

Nassau's diving headquarters is Bahama Divers. Although

continued page 30



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DEEP



LETTERS

Dear Sport Diver,

I am offended beyond words at the cover of Volume 1, Number 1. If Rick Frehsee wants to photograph Sari Gains in all her glory, that's wonderful. If you publish photographs like this that are without any doubt aimed at "men only" and do not reflect the realities of diving, you are acting totally irresponsibly. I'm glad I wasn't around when she brushed up against that fire coral!

How many men divers do you know who dive without a BC? How many men divers do you know who dive without some sort of coral protection, if not protection from the cold? I dove Red Sea last summer, and not one of the group I was with, including Professor Walt Hendrik and Dr. Eugenie Clark, dove without at least a wet suit top, and most wore full suits or blue jeans.

If Ms. Gains looked gorgeous in a wet suit with a BC over it, I'd say more power — most of us look far from glamorous when we dive, but to show her in the briefest possible bikini purporting to be diving, is just too much!

Do you think that only men dive? Do you think that only men are going to read your magazine? If you do, then you will lose a large potential audience of women divers — and quite likely many men as well, who will object to your sexist outlook. The photograph of Ms. Gains on page 61 is equally offensive and belongs in *Playboy*, not in what is purported on your Editorial page to be a publication designed to "...fulfill the sport diver's demands for more underwater related reading material..." You say that "...scuba has finally evolved from a recreation exclusively for the young, daring, athletic minded, to one which involves both the average man and woman, young and old alike." Well, show us that you understand what that means, and get off your self-defeating, stupid, macho attitude. You do all divers a disservice by this sort of "girlie" pictures. Remember, women divers had to pass the same diving course you jocks had to pass — and I'd be willing to bet some of us passed with higher scores!

Majorie Wheaton
New York, N.Y.

I am pleased that the publishers of *Sport Diver* have asked me to reply to the above letter. Although I have received many compliments concerning the cover for the first issue, I feel that the few letters that were received expressing negative reactions deserve an explanation and may have offered valid criticism.

The cover photo was taken for commercial purposes in the Red Sea while I was on assignment for an airline and tourist authority. Ad agencies and art directors not only request, but often times demand, that photographs taken of young ladies underwater not include buoyancy compensators or safety vests. As handsome as some vests are, they can't really compete with an attractive feminine figure. Girls are prettier than boys, underwater as well as topside and comely ladies have been

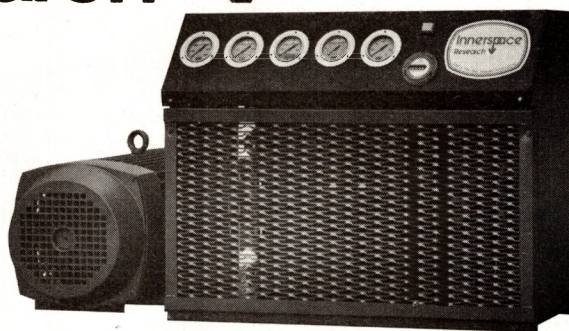
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The Sport Diver staff
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STRUGGLE FOR SURVIVAL

by Steve Matheny

All is not well in the Underwater World . . . Does this ominous lead statement suggest a discussion of the destruction of a once healthy coral reef? Does it refer to an onslaught of red tide or increased incidence of shark attack on scuba divers? No, it does not. Quite to the contrary . . . the dive community is being threatened by a creature whose power is so far reaching and devastating that it bewilders one's imagination. The threat to the dive community is not from the benign and fascinating underwater world but from itself!

Surer than air embolism in its effect and more mysterious than dysbaric osteo necrosis in its prevention, the **APATHY** of the average sport diver, the average dive shop operator, and the average manufacturer of sport diving systems is slowly and surely infesting and strangling the sport that we all profess to love.

Lend an ear for a moment to some disturbing information. Scuba classes are filling at unprecedented rates in most parts of the country. We are participants in one of the most exciting and adventurous recreational activities in the world. And yet, by comparison with other recreational activities such as snow skiing, tennis and others, we are a dwarf whose progress is sometimes faltering and always unpredictable. Annual sales of skin and scuba equipment are eclipsed by that of the **DART BOARD** industry!

We are confronted by a vicious, self-destructive cycle in the diving industry which involves a tremendous amount of energy on the part of a great number of individuals, resulting in an unbelievably small amount of net results.

We, as instructors, expend seemingly endless numbers of hours in what we define as safe scuba instruction, only to have our students burnout and dropout at the rate of about nine out of ten within the first year following their training. This is a scandalous and embarrassing statistic.

What happens to these healthy, normal people that causes them to leave such a fantastic sport? They are being overtly subjected to one of the best outlined, best staffed and meticulously carried out attempts to kill and cripple the sport of diving that has ever been made. And this war against the sport diver or prospective diver is being waged . . . by the *Sport Diving Industrial Complex*.

Shop and independent instructors are to blame.

Dive operators and stores are to blame.

Scuba manufacturers are to blame.

They are all guilty on every suicidal count . . .

Shop and independent instructors are being unleashed on the unsuspecting student by training agencies who offer inadequate preparation for their responsibilities. Instructors teach according to guidelines set up by their national headquarters. They subject their victims to boring, uninteresting classroom sessions where fun somehow never gets mentioned, and to grueling, nausea producing water sessions. Yes, physical conditioning is important, but have you ever had a student or a dive buddy require you to catch two lobsters, three sergeant majors, and then get back to the boat within ten minutes or else you fail! No human being is strong enough to overpower his environment. The student should be taught to relax and adapt to his dive environment. People take up diving as a relaxing, stimulating, challenging and enjoyable pastime. If they don't enjoy themselves, they will take up some other type of recreational activity which is fulfilling. If instructors can't or won't train people to enjoy themselves, then they should get the heck out of the way of serious professional instructors who can. Independent instructors who don't support and never frequent their local dive shops never have an opportunity to evaluate the success of their programs

because they never, or infrequently, see their students after they leave their training programs. This is a serious disadvantage that non-shop instructors operate under. Unfortunately, dinosaur training programs still exist, which point with pride to class rosters that dwindle to nothing by the time the end of the class rolls around. A testimony to the quality of our program. Garbage! The in-shop instructor has many advantages. Better equipment, more advanced training aids and the all important interchange of ideas which occurs with fellow instructors, to name a few. But the shop instructor is not immune from many of the suicidal urges of his independent brother. He is simply able to more accurately judge the fruits of his labor because his students are also his customers. If a student does not invest in safe diving systems and does not buy air, you can be reasonably sure that he is not diving . . . and the drop out clicker counts and records another victim successfully eliminated from the scene.

Dive store operators and shops are to blame too.

An ineffective shop instructor is an extension of the policies of the store. Shops which sell air to anyone, regardless of certification, do not require regular inspection of cylinders and do not provide a friendly atmosphere of professional sales and service, drive their customers away. Sometimes down the street to their competitor and sometimes completely out of the sport.

There are close to 1500 dive retailers in the U.S. Many don't run advanced training programs. They don't run fun trips to keep people diving. All they do is argue and fuss and fight with one another. The number of dive shops that close shop for good every year muffles and checks the professional shop's attempt to establish a reputation for itself in the diving community.

Are divers dumber than the average small businessman? NO! Just ill-informed, undertrained, undercapitalized



and inexperienced. Lack of money, no business background and no training are some of the handicaps that the novice diver operator finds himself saddled with.

The professional shop staff includes educators, counselors, salesmen, divemasters, travel agents, photographers and businessmen. Who does the aspiring shop owner look to for help in preparing himself for this

multifaceted task? Surely not the manufacturers of scuba equipment. No sales training programs are available from the manufacturers. No cooperative advertising programs are available. No reimbursement for warranty labor on manufacturer's products is available.

In short, the manufacturer usually contacts the shop owner three or four times a year through his sales rep (if you've got a good one) and when the bills are overdue. In addition to all of this mess, the store/school owner must provide clean safe air for his customers. This usually requires an expenditure of somewhere between \$10,000 and \$20,000. Investment in rental/training equipment may reach as high as \$10,000 to \$15,000. Hydrostatic testing equipment and miscellaneous repair equipment may average \$3,000 to \$5,000. Repairs and maintenance to air compressor systems is vital and expensive.

The sales inventory that a shop will carry will certainly never be the same but in all cases considerable.

So, in addition to all of the hassles the store owner must contend with, he usually has to go neck high into debt. Put yourself in the store owner's shoes for a minute. Try to feel the pressure of an overwhelming financial investment in addition to all the other responsibilities he must shoulder. His company is losing money (as do many small businesses during their early years) and this is the guy that is expected to greet you warmly when you walk in to get your tank filled that you just bought at the Navy Base, so that you could save \$13.00. What a mess!

Sport divers, instructors, manufacturers, *Get Your Thing Together!* Shop owners, seek out national organizations which attempt to train you and counsel you and your business.

Instructors, move into the dive shop in order to keep yourself current and to make inter-instructor dialogue possible.

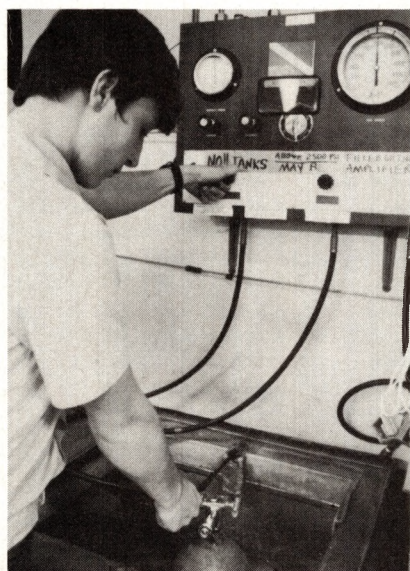
Sport divers, find and support the professional school/store in your area. Don't put up with a low rate operation. Insist on high quality in your equipment systems, your diving trips, your training

programs and your shop personnel.

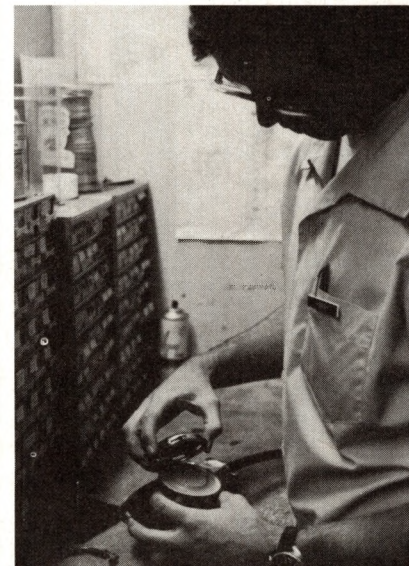
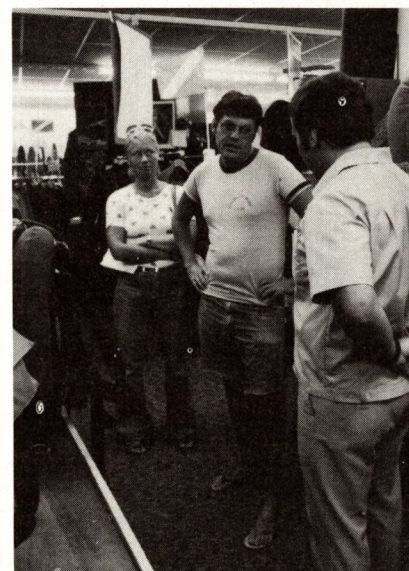
Swing your support behind reputable dive stores and lose your apprehension and your hostilities. This man is someone you can trust, after all . . . he's a reflection of you!

Mr. Matheny is a highly respected NASDS, YMCA, NAUI, and PADI instructor and owns a successful dive store/school.

Editor



RICHARD H. STEWART



DYNAMITE.... PROTECTION



The SeaWay "Fastload" Powerhead, designed and developed by Rhett McNair. This is the ultimate defensive weapon. No corners have been cut just to save you a buck. What we want is to save your life! At Aqua-Craft we think a powerhead should be reliable first, long lasting second, and economical last. Ours is only economical when it happens to save your life. It's \$99.50 with six rounds of ammunition. With a little care, it will last a lifetime... a l-o-o-o-ng lifetime.



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LETTERS

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used in commercial and advertising photography for over a hundred years. In short, I have no choice in the matter if I choose to serve the advertising market. These people pay the bills and, as I am a free-lance rather than a staff photographer, I could not make a living on editorial payment alone.

Unfortunately what you can't see behind the scene is the fact that there is a complete professional crew that is necessary to set up almost every shot. The cover was shot in approximately 15 feet of water. The model is set into position by the photographer; she repeats the position until it is done right many different ways. Just outside of the camera's view, there are scuba instructors and guides, with B.C.s and octopus regulators to offer assistance if needed. I have described and shown the behind-the-scenes precautions used while shooting commercial assignments during seminars at major film festivals. The fact that all you see is the colorful environment with a pretty girl in a bikini that just happened to be swimming through at the right moment attests to the success of the photograph.

I would consider myself a photo illustrator rather than a photojournalist. If I were an underwater photojournalist I would have a whole collection of divers swimming in pajamas, T-shirts, blue jeans, leotards, and mismatched wetsuits. The photographs would be very accurate but not very pretty. Even the environment would suffer for I would not always have time to swim around for the best composition or point of view but rather I would have to snap on command of some happening. I am one of those poor souls that is rarely happy with things the way I find them, not even in the beautiful underwater world am I completely satisfied. Photographs are rarely extremely accurate to their subjects. Flash adds color, lenses warp straight lines, and change apparent perspective. Even macrophotographs taken underwater are not truly natural if only because they are richer than their subject and are isolated from their surroundings. My photos are generally well thought out before I pick up my camera. That's why (hopefully) they are a little unusual. If the editor didn't select photographs that way you would end up with a magazine filled with snapshots that readers would pass by disinterestedly. As a NAUI, YMCA, and PADI instructor, I am concerned with all aspects of diver safety and do not wish to appear to neglect my responsibility in this direction. Although I don't have much time to teach anymore, I would not think of taking open water students into the environment without a B.C. or pressure gauge.

As a working photographer I sometimes have to modify my dive plan and do things a bit differently. In this context, I am not a sport diver. I am making photographs underwater as a greater part of my livelihood and I make decisions based on knowledge and experience. You could place all of the working underwater photographers in the U.S. who have always dived with a buddy, always worn a B.C., never

dived below 132' et cetera, et cetera onto the head of a pin. I can't think of one, and I think I have dived with most of them. The point is that while I try to set good examples for others I can't always be a model sport diver.

Sari Gains depends upon being a very pretty young lady as she is a professional model and makes the better part of her living in that direction. She is also an excellent diver and has worked underwater since 1970. The swim suits that Sari wore on the cover and on the inside layout, while custom tailored, are all popular suits that are no more revealing than that which I see on the majority of good figures on south Florida beaches.

Jacqueline Bisset's famed wet T-shirt look was the subject of a recent cover for Skin Diver Magazine. That this kind of presentation should be taken out of context and used as a model for potential or novice scuba divers is absurd. Ms. Bisset and others in the cast were protected superbly from any environmental or physical hazard by a team of professionals throughout the filming of the "Deep".

Perhaps along with the photograph that is lacking some equipment or in some other way is not in strict keeping with the sport divers code, a word of explanation could be offered with an editors note. That's not really my decision but it is a suggestion worth considering.

Please consider the problem that this magazine has in trying to appeal to a wide cross section of people from the Atlantic to the Pacific Coasts and from abroad. Some want local coverage while others want exotic dive spots. Some want spearfishing and others abhor it. Some want nudes and others want divers up to their ears in cold water wet suits. While trying to satisfy the majority they are bound to dissapoint a few. If you only liked 90% of this book or agreed with 80% of the editorial, isn't it worth supporting?

Finally, as a gesture of equality I have offered a picture of myself in bikini swimsuit for the cover of the next issue of Sport Diver. You guessed it — they turned it down. Sorry gals, there's no justice.

Rick Frehsee

Dear Sport Diver,

Thank you for the copies of your spring issue. You have done a great job for your first issue. We wish you all the best with your new magazine.

Francois R. Brenot
Executive Vice-President
The Jean-Michel Cousteau Institute

Dear Sport Diver,

In regard to Paul Hill's lobster article in your first issue, let me assure him that many lakes in southern California are loaded with crawfish.

Pete Schoen
Laguna Beach, Ca.

Dear Sport Diver,

Congratulations on your first issue and best of luck to you for the future.

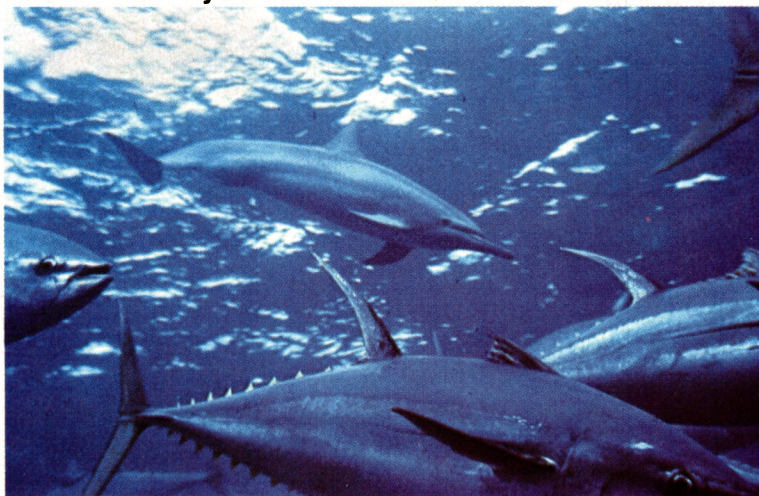
Victor Flandres, Publisher
Dive Canada Magazine

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Dolphins, Tuna, and Confusion.

Article by Stan Minasian

**Well, the fact of the matter is
that they had no choice . . . and no chance.**



The 1977 tuna fishing season started off with an uncharacteristic whimper for American tuna fishermen. Since the purse seine tuna fishing system revolutionized the industry in the late 60's, over six million dolphins (commonly called porpoises) have suffocated in the webbing of the three quarter mile long nets, and this year the industry felt what is only the beginning of a burgeoning public outcry.

For the past 30 months the fishermen and their representatives have spent more time in Congress, the Senate and the courts than they have spent in the eastern tropical Pacific, the location of the prime tuna fishing waters and also the place where the dolphin kills occur. These appearances in Washington, D.C. are building a legal history unparalleled in industry-environment confrontations.

Photographs courtesy of
Save the Dolphins Foundation



The dolphin is an amiable, highly intelligent mammal, and most seem quite at ease in the presence of man. A game of tag with the rubber-suited visitor seemed just right for this bottlenose. The grisly scene (inset) is at dockside after a tuna boat has unloaded its catch. These dolphins drowned after becoming entangled in the net set around them by tuna fishermen.

Photograph by Tim O'Keefe

**During the 1974 season, it was estimated
that the industry had killed over 150,000 porpoises.**

This Pandora's Box was first opened in 1969 when William Perrin, then a zoology student at the University of California at Los Angeles, explored the cannery area of Terminal Island, California where it had been reported that dead dolphins were coming back in the holds of tuna boats. Curious as to why these animals were appearing with tuna, Perrin accompanied a tuna crew for two trips as a research biologist. He discovered, much to his amazement, that the pole and bait system of fishing had been replaced by a large net which closed off at the bottom and was drawn back on board by a power block attached to the end of a large boom which swung out over the water. The method of locating the tuna remained intact, only the system of fishing had changed.

The pole and bait system of fishing utilized the enigmatic relationship between dolphins and yellowfin tuna, a relationship apparently limited to the waters off western South America, Central America and the lower half of Baja, as far west as Samoa. Here it was discovered many years ago that schools of yellowfin tuna swim directly below herds of spinner, spotted and common dolphins. Theories for the relationship have centered around foraging, orientation and a shallow warm water thermocline, but the relationship still remains a mystery. It is known however that the tuna follow the dolphins in what must be a mutually beneficial relationship. The bait fishing boats would approach the dolphins and throw out small live bait which would send the tuna below into a feeding frenzy. Once the frenzy was established the fishermen would cast out their unbarbed hooks from thick calcutta poles and haul the fish on board one at a time. The tuna struck at anything remotely resembling a fish while the dolphins, easily able to discern the hooks from the bait fish with their sophisticated echo location system, never struck the hooks. So in the bait fishing method there was one of those strange, uneasy partnerships between a wild animal and man. The fishermen had a good way of locating the tuna, the dolphins received a free lunch and the only party to suffer was the tuna.

The invention of the power block in the late 60's revolutionized the tuna fishing industry as it gave

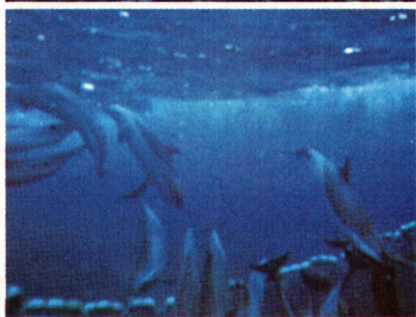
them a reliable method of retrieving the net set out around the dolphins and the tuna. Certainly the dolphins were going to have no part of this if they could help it. Well, the fact of the matter is that they had no choice and no chance.

Speedboats used to chase the dolphin herds, slow them down and allow the mother boat to set the net around the confused and frightened animals, the tuna remaining below them throughout the entire operation. A large powerful skiff is dropped from the fast moving mother boat with one end of the net attached. The vessel circles the dolphin herd and comes around to meet the skiff. Both ends of the net are tied off to the port side of the mother boat while the bottom of the net is closed by pulling on a cable running through iron rings along the bottom. The net extends down some 350 to 400 feet to prevent dolphins from diving out from under it prior to its closing. One end of the net is then run up through the power block and slowly hauled back on board.

Over the years the fishermen have developed a method of releasing the dolphins from the net but this method is extremely sophisticated and requires great skill on the part of the captain and the crew to be effective. It is called "backing down" and consists of running the vessel in reverse to pull the tip of the net (the area where the mammals congregate) out from under the dolphins giving them back their freedom. When the tuna see the opening and head toward it the captain, high in the crow's nest and able to look down on the entire operation, puts the vessel into neutral bringing the net back to the surface. This can be done as many times as necessary to release all the animals from the net, and for the most part it works very well, having cut the death rate over the years by a factor of about 50%. Still, when considering that an estimated 425,000 dolphins

died in 1971, this system can hardly be labeled a panacea.

The Marine Mammals Protection Act of 1972 was passed by both houses of Congress and signed into law by President Nixon. It specifically gave the tuna industry a 24 month grace period in the killing of dolphins, and required a cooperative research and development program between the tuna industry



These exclusive photos supplied by Save the Dolphins were taken secretly by a concerned tuna boat crewman who asked to remain anonymous. The net which has been set around the dolphin herd and the tuna is drawn tight (top). During "backing down" the net sinks slightly, hopefully allowing the trapped dolphins to escape. some survive this maneuver, while others can be seen floating tail upwards to the surface.

and the National Marine Fisheries Service, a Commerce Department entity, as well as implementation of a program designed to meet the statutes of the Act which called for a kill of "insignificant levels approaching a zero mortality and serious injury rate". Bill Perrin, the man who first released the problem to the general public by presenting a paper on the killings at the 1969 Bio-Sonar Conference at Stanford University, was one of the government personnel in charge of this program. It was a tough job indeed.

During this period of time environmentalists were busy informing the public of the killings and soliciting support for the cause. One group, Save the Dolphins, produced and directed a

major motion picture documentary on the subject titled "The Last Days of the Dolphins?" which was narrated by Dick Cavett and was the recipient of three Emmy Awards. The tragic news of this problem was reaching the public and they did not like it.

By October of 1974, the expiration date of the 24 month grace period, the industry had not reduced the killings to the specifications of the Act. By extrapolation of data received from government observers placed on about 10% of the vessels during the 1974 season, it was estimated that the industry killed over 150,000 dolphins, a far cry from the "insignificant levels" as mandated by the Act. In spite of this discovery the Commerce Department issued a general permit to the fleet allowing a continuance of this destructive fishing method provided that research continue to reduce the deaths further. Outraged by this direct violation of the Act, the Committee for Humane Legislation, the Environmental Defense Fund, and the Fund for Animals filed a law suit against the Commerce Department. The court battle went on for nineteen months and in May of 1976 Judge Charles Richey, in an historic decision, ruled that the Commerce Department had indeed clearly violated the law by issuing the general permit and, further, that the fleet had been fishing illegally. Judge Richey gave the industry two weeks to notify all of their vessels that "porpoise fishing" be immediately terminated (we should note here that "porpoise fishing" amounts to only 40 or 50 percent of the overall catch, as yellowfin tuna are also caught while feeding alone on the surface).

An immediate appeal by the industry brought a decision which allowed them to continue fishing on the mammals until the end of the year, at which time further "porpoise fishing" be terminated until the National Marine Fisheries Service was able to answer certain critical biological questions about the health and stability of the dolphin herds. By the end of the 1976 tuna fishing year the fleet had killed



Photograph by John Larsen

another 110,000 dolphins.

January 1st marked the beginning of the 1977 tuna fishing season and the beginning of Judge Richey's ruling. The fishing boats had no authorization to fish on the dolphins. The National Marine Fisheries Service, in accordance with the Richey ruling, was to assess the dolphin kill, find the level of kill which could be biologically sustained without risking the health of the herds, and assure that an intensive research and development program commence to bring the kill down to the insignificant levels as required by the Act. The Commerce Department, sifting through their data collected by observers the previous year, proposed a kill quota of 29,000 animals for the

1977 season. After public hearings in Washington, and San Diego the regulations came out in February of this year and allowed the fishermen a kill quota of 59,000 animals. However, they were not allowed to kill the off-shore spinner dolphins as they had been declared legally depleted, meaning that they were down to 50 or 60 percent of their original virgin populations, and under federal law depleted species can not be exploited. Arguing that the spinners and spotted dolphins were often mixed in with each other and therefore difficult if not impossible to tell apart, the fishermen protested this regulation by sailing all of their vessels into San Diego harbor with flags at half mast. On May 14, ironically exactly one year after Judge Richey's decision, the fleet left San Diego harbor again on their way to the eastern tropical Pacific to resume porpoise fishing. A bill introduced by Congressman John Murphy of New York was near passing. Once signed into law as an amendment to the Marine Mammals Protection Act it would give the industry a kill quota of 79,000 (20,000 more than the proposed quota), and would allow them up to 12,000 off-shore spinner dolphin kills provided that they were truly accidental; meaning that the animals were not observed prior to the setting of the net around the spotted dolphins.

More law suits are destined to follow, other legislation will no doubt be introduced, but the problem will not be solved. Indications are that future research will continue to orbit around modifications of existing purse seine techniques and while these may prove positive during normal sets, they do not have an effect on problem sets caused by gear malfunctions, rough weather or poor judgement by the captain and crew. Between 70 to 80 percent of all deaths occur during these problem sets and only 6 to 10 percent of all sets end up with these disasters. They are extremely difficult to predict and to eliminate.

The Save the Dolphins organization in San Francisco, California, is currently researching an

continued next column

alternative method of tuna fishing which would lure the tuna to an artificial dolphin herd. Most researchers believe that the tuna are attracted to anything on the surface as a substantial percentage of the catch are found around floating objects such as logs, wooden hatch covers or dead whales. A dolphin herd is merely hundreds of floating objects on the surface to which tuna are attracted. By the re-creation of all of the physical characteristics of a living herd (pressure waves, turbulence, acoustic and visual) the chances of attracting tuna are excellent. Once the bond between the fish and the mock herd is created, a practical alternative tuna fishing method will have been created, one which would not entail the setting of the net around living mammals.

It is hoped that this type of research will lead to the desperately needed solution to this tragic problem. Only in this manner can the best interests of both the dolphins and the tuna industry be served.

For more information on this research project, please contact: Save the Dolphins, 1945 20th Avenue, San Francisco, California 94116.

LETTERS

continued from page 22

Dear Sport Diver,

It looks like I'll have to eat a little humble pie. I purchased 15 copies of your spring issue with some reluctance and sold them out in three days. With apologies for being basically conservative I would like to double future orders to thirty.

**Dick Spencer, AquaCenter
Newport Beach, Ca.**

Dear Sport Diver,

May I congratulate you and your entire staff for a perfectly beautiful and interesting magazine.

Although I have not personally engaged in scuba diving for a few years, I nevertheless enjoyed the articles and the marvelous photography.

I will look forward to the next issue and wish all involved in the producing of this magazine much success.

**Mrs. J.W. Tankersley
Ocala, Fl.**

Dear Sport Diver,

I have just received a copy of your new magazine. I am extremely impressed with the quality of your magazine and wish to congratulate you on your success. The U.S. diving industry desperately needs this kind of media.

**Samuel G. Lecocq,
Executive Vice President,
U.S. Cavalero, Inc.,
Costa Mesa, Ca.**

Dear Sport Diver,

Being the devoted freshwater diver I am, my eyes have been degenerated by the ever silty lakes of East Texas and the B & W photos of "Skin Diver Magazine". While examining the contents of your mag', my eyes received quite a shock from the "razzle-dazzle" of the color photos. This new product is going to be a real hit among divers world wide, while SDM is an oldie but a goody, you have gotten billing with first issue. With two diving magazines on the market now, at least one could have a section for us skin divers, so have a heart guys.

**Kenny Smith
Henderson, Tx.**

Dear Sport Diver,

May I take the opportunity of congratulating your staff on a truly magnificent first issue of what is obviously to be a great magazine. We are anxiously awaiting your future issues.

**Harry V. Houghton, Managing Director
Aquasnap, Bridgewater, England**

Dear Sport Diver,

Enclosed is my subscription. After seeing your first issue, I can see this magazine is going to be a big success, and I want to be one of the first subscribers. Please extend my sincere congratulations to all your staff who worked so hard to get this magazine off the ground.

**R. S. Blount, Jr.
St. Louis, Mo.**

Dear Sport Diver,

You have an interest in retailers as your letter says? The retailer depends on customers. Our customers are men AND women. We treat both with respect.

It is certainly too bad your first poster is of a woman diving without a vest. I have never seen a picture of a man diving without a vest.

The poster is beautiful. People who are

not divers would not understand that you treated a woman as being not a serious, safe diver.

Too bad. Our store will not place any orders for your magazine.

**Katharine Lasley
Princeton Aqua Sports
Princeton, N.J.**

Dear Ms. Lasley,

I, too, agree with your opinion concerning proper diving apparel on both men and women in pictures found in national diving publications. Although we are deeply concerned and involved with the safety aspects of sport diving, the major purpose of this publication is entertaining people visually and editorially.

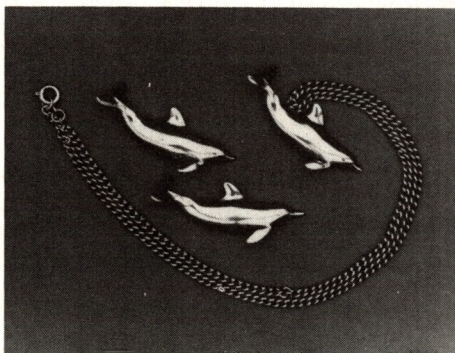
We are by no means exploiting women, but find the female anatomy as equally beautiful as the sea in an artistic photograph. There are, of course, artistic and illustrative photographs; the latter being quite abundant in our Spring issue. The very safety equipment you mentioned missing on our poster, is unfortunately the least attractive of all dive gear. During the course of shooting such photographs with the absence of a B.C., the addition of a safety diver is common practice. This in itself shows the photographer's interest in his model's safety.

Myself, being an underwater photographer/model realize this, and hope you will too. I sincerely hope you reconsider displaying our magazine, as it will surely benefit your shop, as well as your customers and our industry, by providing the most complete coverage of sport diving.

**Kathy S. Bentley
Assistant Publisher**

continued page 110

HELP SAVE THE DOLPHINS



Pins \$5.50; Necklaces \$6.50

Each year over 100,000 dolphins are needlessly killed during tuna fishing operations. Your purchase of these beautiful pewter spinner dolphin pins and necklaces will aid in the research of an alternative method of fishing. Become involved.

Send your check or money order to **Save the Dolphins** 1945 20th Avenue, San Francisco, California 94116. Save the Dolphins is a federally registered, non-profit organization. Dolphin's actual size is 2 inches



THE DEEP REVIEW

Many superlatives have been applied to the film "The Deep" by the studio PR men: most extensive underwater filming, most realistic dive film, best underwater photography, first underwater film shot in Panavision... the list goes on. Surprisingly, most of these adjectives are true. For once the advance publicity has been, with few reservations, accurate.

The photography is indeed very, very good. Stan Waterman and Al Giddings have done a superb job of filming in some rather tricky situations. The lighting is always nicely balanced, even in the underwater interiors where limited space, close up and far away objects, and the surrounding medium, water, make adequate control of light almost impossible. Giddings' and Waterman's control is not simply adequate, it is artistic as well.

The sequence in which Nick Nolte, Robert Shaw, and Jackie Bisset recover the glass ampules from the wrecked ship contains one of the most incredibly beautiful shots I have seen in any film. As the ampules dance just above the surface of the sand, the camera dollies out and booms down simultaneously until the amber fluid-filled tubes fill the screen.

Considering the quality of the photography and the invention of an underwater housing for the Panavision camera by Giddings, it can be said that Waterman and Giddings have advanced the state of underwater cinematography with this film.

The acting is good throughout. The bad guys are bad, the good guys are good, and there is excellent character definition among the major characters. The cast and director Peter Yates are to be complimented on the believable manner in which they execute the script.

Peter Benchley's script is light, entertaining, and quick paced. Only a few scenes are marred by the unbelievable. Most notable among these is the final scene in which Robert Shaw emerges from the water after setting off an explosion in the sunken munitions carrier. Bags and bags of plastic explosive and several hundred tons of World War II vintage ordnance are detonated, blowing the huge

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steel hull apart and sending a geyser 40 feet into the air. It was this same type of explosive, a dynamited munitions ship, which killed pioneer salvage expert Giani and his crew in 1930. The only difference between the two incidents is that, in the movie, Shaw is swimming directly over the wreck when the explosion goes off, while Giani and his men were in a boat a quarter of a mile away. Undaunted by history and the laws of physics, Shaw emerges from the boiling sea, clutching a piece of Spanish treasure.

Despite this small inaccuracy, the ending is delightful and the audience is fulfilled. This film was not made to show off the cast, the script, or Giddings' and Waterman's technical veracity, although it does all three. "The Deep" was meant to entertain its viewers, and it does that superbly.

Jacqueline Bisset (left) tends the air hoses while Nick Nolte and Robert Shaw explore the wreck of a French ship, the Griffon, found lying underneath the wreckage of a World War II munitions ship. At right Nolte and Shaw examine a gold ball filled with pearls. The jewels aboard the Griffon are from the Spanish treasure fleet which sank off of Florida in 1715.



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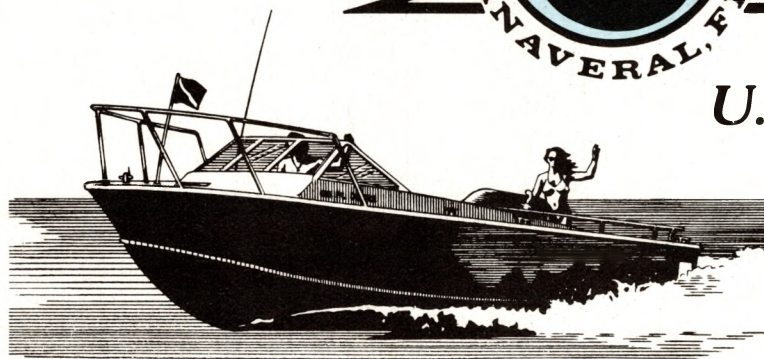
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FREEPORT & NASSAU

continued from page 17

not as extensively equipped as the Underwater Explorers Club, Bahama Divers is well organized and staffed by a very friendly, very professional group. Their pro dive shop is incorporated with the Pilot's House Hotel, and is located along the harbor's intracoastal waterway, just minutes from most of the best night spots. Catering to both American and European divers, Bahama Divers maintains one of the most complete selections of gear in the Bahamas. The extensive dive program includes both regularly scheduled open water courses and a well-taught resort course. The Pilot's House Hotel offers the convenience of being next door to the shop and dock, plus the economy of special seasonal diver rates. For those who stay in other hotels in Nassau, Bahama Divers has a pick-up and return service for their daily dive trips.

Bahama Divers' custom 42 foot and Donzie 35 foot dive boats have plenty of room for the visitors to move about,

prepare for the dive, or just relax on deck. The most distant dive site is about 40 minutes from the dock. This area contains both deep water reefs, down to 60 feet, and ledges which begin around 80 feet and drop vertically into the ocean. A unique feature of this wall is the caves and crevices which are large enough to provide interesting exploration, but not large enough to encourage unsafe penetrations.

There are beautiful shallow reefs too. They extend and protect the entire perimeter of the island and are also found as solid masses which come right to the edge of the wall. There are several wrecks around the island, the most interesting of which is just outside Nassau harbor. The *Mahoney*, a vessel that was once the pride of the islands, sank during a fierce hurricane while shuttling residents from the neighboring cays. With her last load of passengers huddled on the foredeck, she made her way towards sheltered waters, only to be driven aground on the shallow reefs. Today the proud ship is home for a multitude of fish, and an excellent dive for the sport diver.

All in all, the diving around New Providence is better than most would expect, given its population and degree of industrialization. Normally the waters surrounding this thriving island are clear

with an average visibility of 80 feet plus, and there are a large number of big fish, such as Nassau Grouper and Snapper. During the season, the sun is seldom overcast, and it is possible to dive every day. So, the next time you're planning a short getaway, consider the only two islands in the Bahamas that can deliver days of interesting diving, island tradition and history, and nights filled with never-ending action. See Freeport and Nassau.

Underwater Explorers Club
Box F2433,
Freeport/Lucaya, Bahamas

Bahama Divers
P.O. Box 5004,
Nassau, Bahamas

Mackey International Airlines
3116 S. Andrews Ave.,
Ft. Lauderdale, Fl. 33316

Bahamasair
228 S.E. 1st. St.,
Miami, Fl. 33131

Bahamas Department of Tourism
225 Alhambra Circle, Suite 425,
Coral Gables, Fl. 33134

Can diving hurt your hearing?

by M. Timothy O'Keefe

One of my good friends is a diver in his early 50's. He can be a difficult person to talk to, not because of his personality, but because I have to talk at least twice as loud to him as anyone else. This person is a very active diver and is quite healthy except for his hearing. In that respect he is more like a person in his 70's than his 50's, and the problem seems to get worse every year. I've wondered if he will be able to hear at all when he is 70.

His condition started me wondering about myself and anyone else who spends a fair amount of time in the water. Does diving affect our hearing? Can diving cause a hearing loss? Can anything be done to prevent this, or is it something, like old age, that just happens?

According to Dr. Tom Mullin, an audiologist at Florida Technological University who has done extensive research related to diving and hearing, the average diver has little to worry about if he exercises common sense.

In fact there are many occupations where workers suffer a much greater risk of damage to their hearing because of the noise level on the job. "Persons who operate a punch press, a cement block machine or are riveters are far more likely to suffer a hearing loss than divers," according to Dr. Mullin. So are people exposed for long periods to



noises from motorcycles, air boats, some power tools and even lawn mowers, he says. A motorcycle buff is more likely to suffer hearing loss than a sport diver. Those seem like pretty good odds.

There are several ways a diver can suffer a hearing loss, each more progressively severe. The first is through a common ailment called "swimmer's ear."

"'Swimmer's ear' is a fungus or bacterial infection in the outer ear. It is medically known as 'external otitis', Dr. Mullin says. "This is a common problem for anyone who spends a great deal of time in the water, especially in swimming pools."

"The symptoms are frequent pain and drainage or itching, though not necessarily any actual hearing loss. Continued exposure of the ear to water will only irritate the condition," Dr. Mullin advises.

For an infection to exist in the ear three elements are necessary: warmth, darkness and moisture. We can't do much about the first two conditions, but staying out of the water may eliminate the third. This, plus medical treatment, can clear up the condition in a week or two. If you persist in diving with swimmer's ear you are asking for trouble, as it could cause your eardrum to become perforated. With this you shouldn't dive at all — possibly ever again.

The perforation results from too much pressure on the eardrum and may cause a significant hearing loss.

A second hearing problem is one associated with how long you've been diving.

"Anyone who has been diving regularly for a considerable period of time will probably notice a slight hearing loss," says Dr. Mullin. "This is because the eardrum becomes thickened after long periods of diving, causing a sluggishness of movement of this membrane."

This sluggishness may result in what is known as a conductive hearing loss. This only impairs hearing to a slight degree and is usually medically correctable. It is

Two of the most common diving induced hearing ailments

Swimmer's ear is an infection of the outer ear. A common problem for those who spend a lot of time in the water, its symptoms are pain, itching, and drainage. Although fairly easy to cure, left untreated the infection could lead to build up of pressure and a perforated eardrum.

Repetitive dives over a period of time cause thickening of the eardrums and a loss of flexibility in that membrane. The thickened eardrum is less sensitive to vibration, and a slight hearing loss results. This condition is usually medically correctable.



All divers should have a hearing check at least once a year

something that should be watched for through regular hearing tests.

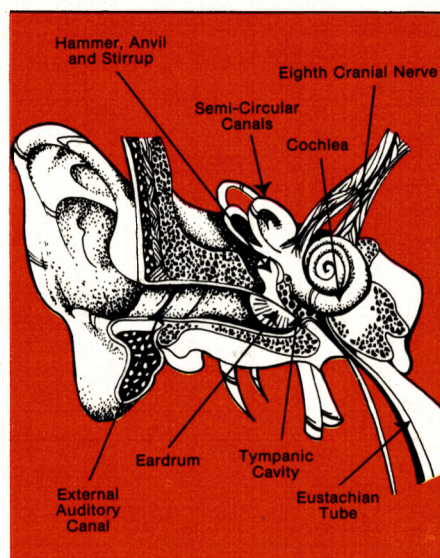
There is a third type of diving-connected hearing loss that cannot be corrected. It is a common problem among professional divers but *not* sport divers.

Dr. Mullin explains: "Divers say that they're 'clearing their ears.' Actually, they're not clearing anything, but simply equalizing pressure in the middle ear cavity with the outside pressure, which can be significant depending on the depth of the dive."

"The air pressure in the middle ear exerts a tremendous amount of pressure on the part of the ear known as the oval window, the link between the middle and inner ear."

"The inner ear contains several incompressible fluids. So what happens is that a tremendous amount of pressure is being placed on incompressible fluids. This tends to change the chemical makeup of these fluids and causes hair cell damage in the inner ear. Unfortunately, these hair cells are actually nerve endings."

"Once these nerve endings are damaged nothing can be done medically or surgically to correct the situation. This nerve damage results in a high frequency hearing loss similar to that experienced by older people. People may be able to hear



what is being said but they may not be able to understand it," according to Dr. Mullin.

This type of hearing loss is permanent; hearing aids are often of little help. A diver with a nerve-connected loss normally asks people to speak louder so he can hear better but he still may not be able to comprehend better despite the increased volume. This is because the hearing loss is mostly in the high frequency range. All consonant sounds of speech are in the high frequency range, vowels are at the low end of the spectrum. Since approximately 90% of intelligible

speech is formed from high frequency components, this type of hearing loss is a serious one.

In such instances a diver will have the most difficulty in understanding women and children since their voices are higher-pitched. In addition, damage to nerve endings often results in a phenomenon known as recruitment, in which loud sounds are unusually irritating to the victim. Hearing aids which amplify sound cause the hearing aid user to complain that everything's too loud and still they often don't understand.

Such a condition *need never occur* in the first place. Persons who frequently dive deep need to have their hearing checked periodically to see if they are beginning to suffer a hearing impairment. All divers should have a hearing check at least once a year, the same interval recommended for any routine medical examination. More avid divers might have such a check-up every six months.

This check-up is not performed by the average physician. It involves a visit to an audiologist or an otolaryngologist who will conduct an electronic hearing test to see if any high frequency hearing loss has occurred. For the test you are placed in a small soundproof room, and different frequencies of sound are

continued page 46

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SPORT DIVER

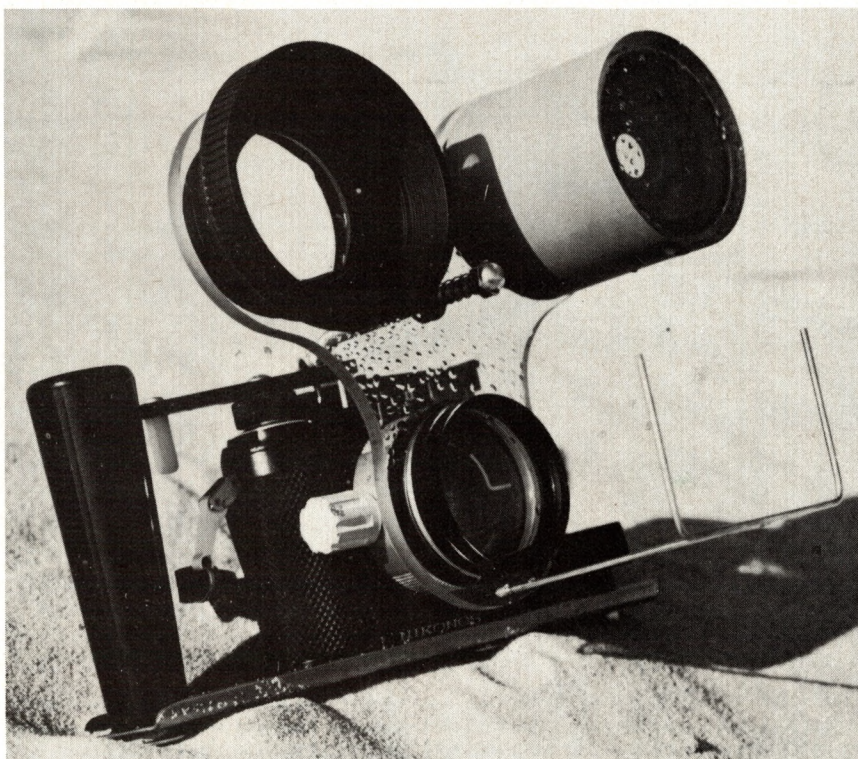
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NEW FOR 77

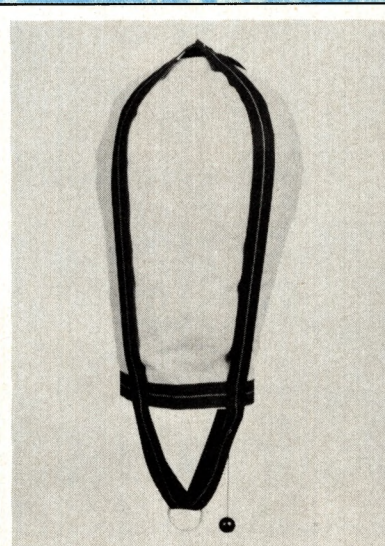


QUICK CHANGE ARTIST . . . The NEOS LENS TURRET SYSTEM now allows owners of Calypso and Nikonos (I, II, or III) cameras to change lenses underwater as easily as on land. Made of tough Lexan and stainless steel, the Turret attaches to the camera's accessory shoe and accepts all makes of Nikonos auxilliary lenses. The Turret is \$39.95 from New England Ocean Services, Bldg. 29, Boston Marine Industrial Park, 660 Summer St., Boston, Mass. 02210.



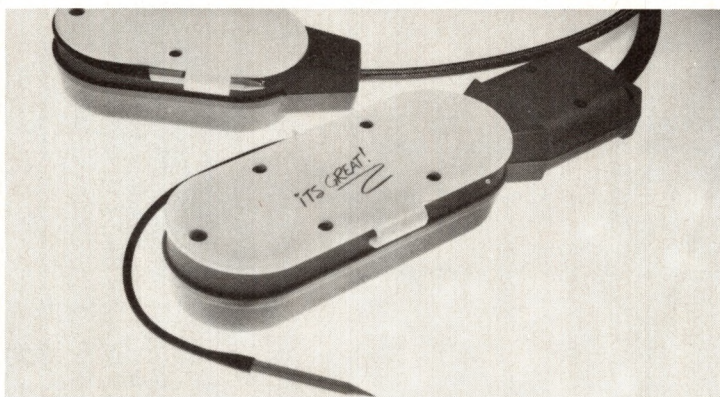
CINEMASCOPE AND PANAVISION . . Sportsways new parabolic mask gives ultrawide vision and has very low displacement. The secret is in the curved lens that makes this mask unique. Double lip seal, low, low, volume with virtually no undersea distortion. Sportsways, 2050 Laura Ave., Huntington Park, Ca. 90255.

Buckle up in style with these two new dress belt buckles from Dacor. Model BB1 is the Dacor emblem, model BB2 portrays a wreck diving scene. Made from a pewter base these antique finish buckles will fit any 1½" belt. From Dacor Corp., 161 Northfield Rd., Northfield, Ill. 60093.



FOR A BIG LIFT . . . These new bags are made of vinyl-impregnated nylon with buoyancy control valve. 100, 200, or 450 lb lift. U.S. Divers, 3323 W. Warner Ave., Santa Ana, Ca. 92702.

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Double tank manifold allows connection of two independent regulators to dual tanks. Scubapro, 3105 E. Harcourt, Compton, Ca. 90221.



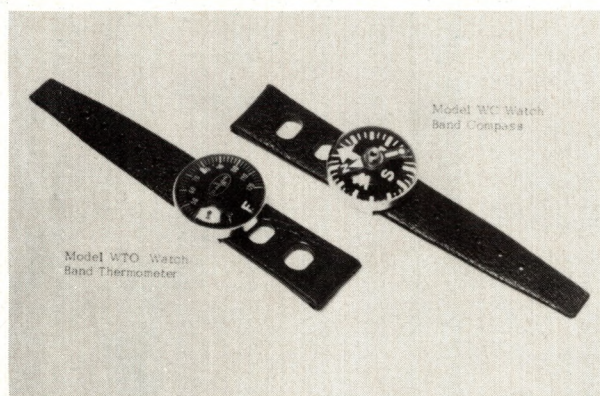
CHARGE! Healthways new rechargeable 6 volt battery is ideal for use in diving lights. Its unique Solid-Gel formulation assures a constant 6 volt output, and can be recharged from a wall socket or auto cigarette lighter. Healthways, 5340 W. 102nd St., Los Angeles, Ca. 90043.



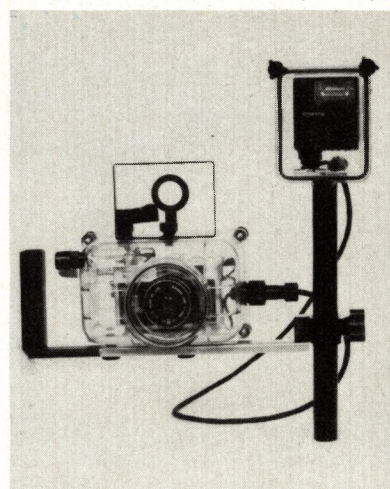
UNIVERSAL INSTRUMENT CONSOLES by Pennform are designed to house nearly all of the finest gauges available from any manufacturer. The Pennform console system displays all of your essential data at a glance, and the compact unit frees your arms of troublesome straps. Two piece construction, molded high impact polypropylene available in black, blue, red, yellow, and green. Pennform Plastic Products Inc., 365 Mulberry, Wyandotte, Mi. 48192.

New wet suit accessories from Parkway include a hard-soled boot with cushioned non-slip sole. Boot has no back seam and the ankle is tapered to prevent water leakage. Available in nylon-2 sides or sharkskin. New grabber glove has anatomically precise thumb, reinforced fingers, nylon-2-sides. Cold water hood has contoured chin and wider face opening. Nylon-2-sides. Parkway Fabricators, 241 Raritan St., South Amboy, N.J. 00879

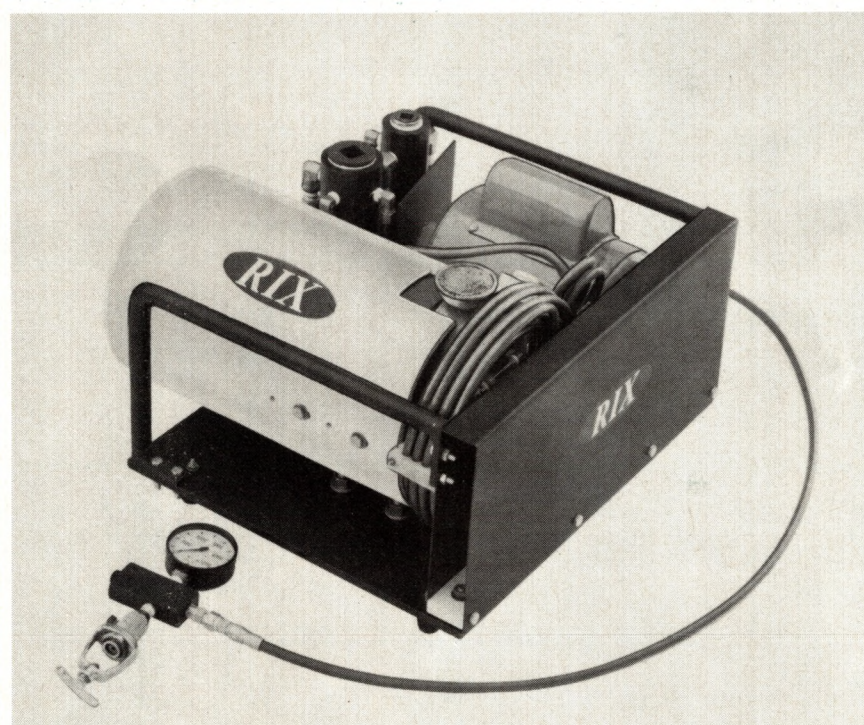




Dacor models WTO Wrist Band Thermometer and WC Wrist Compass are oil filled instruments that fit on most watch bands. Temperature readings from 0-120°F on thermometer, compass needle and principal headings are phosphorescent. Dacor Corp., 161 Northfield Rd., Northfield, Ill. 60093.



New Aquasnap housing for compact 35mm rangefinder cameras features two-piece molded body with "O" ring seals and twist knob closure. Ricoh of Canada, 16 Lesmill Rd., Don Mills, Ontario, Canada M3B 2T5.



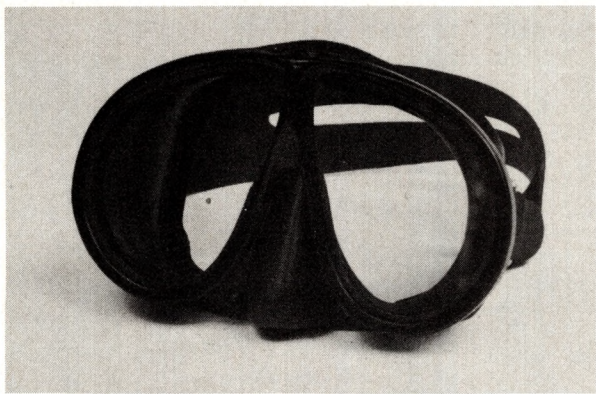
A BREATH OF FRESH AIR is all you'll ever get from the new RIX Model 1S3B series of air compressors. The OIL FREE, portable compressors were developed expressly for filling high pressure breathing tanks. Self-lubricating teflon composite piston seals permit complete oil-free operation at 3200 psi discharge without lubricants of any kind in the compression cylinders. The new series includes two and four SCFM capacities, with gas or electric drive. RIX Industries, 6460 Hollis St., Emeryville, CA 94608.



New B.C. from Sportsways features double bag construction with a lightweight inner bag of super abrasion-resistant vinyl coated nylon. Provides 33 lbs. of lift, has a 26 gram CO2 cartridge. Special mouthpiece valve prevents intrusion of water. Full zipper around neck opening allows access to inner bag. Sportsways 2050 Laura Ave., Huntington Park, Ca. 90225.

TEKNA LITE is a five inch long, nickle-cadmium powered rechargeable light that weighs less than nine ounces. The light is small and compact, but produces the same brightness as a six-volt lantern using a #4546 sealed beam. The ni-cad battery pack provides one full hour of light and is completely modular, allowing instant replacement with another charged module if more than one hour of running time is required. Suggested price is \$29.95. TEKNA, 3549 Haven Avenue, Menlo Park, CA 94025.

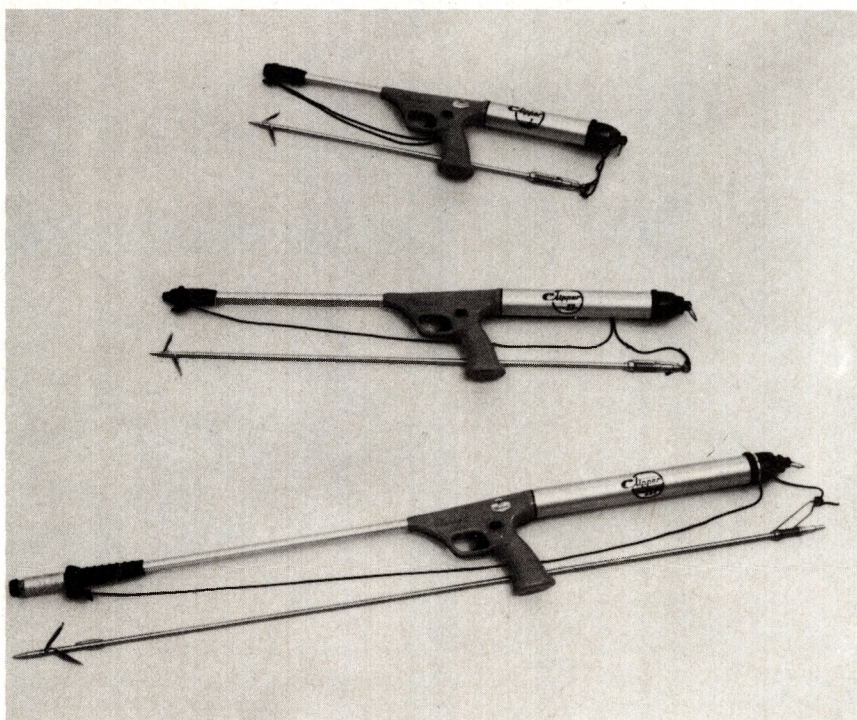




New Equaleye mask has a very low profile and minimal displacement for free diving efficiency. Finest vision for scuba with tempered dual lenses. Soft, double feathered edge seal and nose pocket. Sealed purge valve may be cut open. Dacor Corp., 161 Northfield Rd., Northfield, Ill. 60093.



Razor-like filet knife has an 8 inch stainless steel blade and a simulated bone handle. Includes sharpening stone and sheath. Scubapro, 3105 E. Harcourt, Compton, Ca. 90221.



Clipper series of spearguns by U.S. Nemrod use a charge of compressed air for power. Body of the gun forms a hermetic chamber, and loading is accomplished by pushing the spearshaft into the barrel. The piston is forced backwards, recompressing the trapped air. Available in 15", 26", 35", and 48" lengths. U.S. Nemrod, P.O. Box 5188, Hamden Conn. 06518.



Capsule diving gauge from Scubapro is oil-filled and temperature compensated to provide outstanding accuracy. Fits into Scubapro instrument console, has luminous face. Scubapro, 3105 E. Harcourt, Compton, Ca. 90221.



The Mariner II pneumatic speargun is a revolutionary new design featuring a three-position power selector which minimizes the power needed for loading, yet provides maximum power with a flick of the switch. There's a newly designed piston, a minimum of moving parts, formed pistol grip, and a push button safety. 36" long with a range of 15'-25'. These features are also available on the Mariner III which has a range of 16'-31'. From U.S. Nemrod Inc., 2315 Whitney Ave., Hamden, Conn. 06518.

THE EDIBLE SEA

by Paul J. Hill

the sea urchin GOLD RUSH

There is a multi-million dollar industry developing for divers who gather the lowly sea urchin in Southern California. Sea urchins are spiny ocean-bottom scavengers whose golden roe is considered a great delicacy in many countries around the world. However, it is the great demand in Japan that is causing the sea urchin "gold rush" in California.

The richest urchin areas on the Pacific coast are off Los Angeles and Santa Barbara. In Santa Barbara waters, a diver can bring in 80,000 pounds of urchins a month while working only five days each week. Divers leave port in many boats just before dawn, usually with one or two divers in each boat, then work up to eight hours a day at depths of 25 to 40 feet. Most divers, using hookah gear, are harvesting the urchin nuggets with short-handled rakes. They rake up urchins and send them to the surface in large nets, to be loaded into containers aboard their boats.

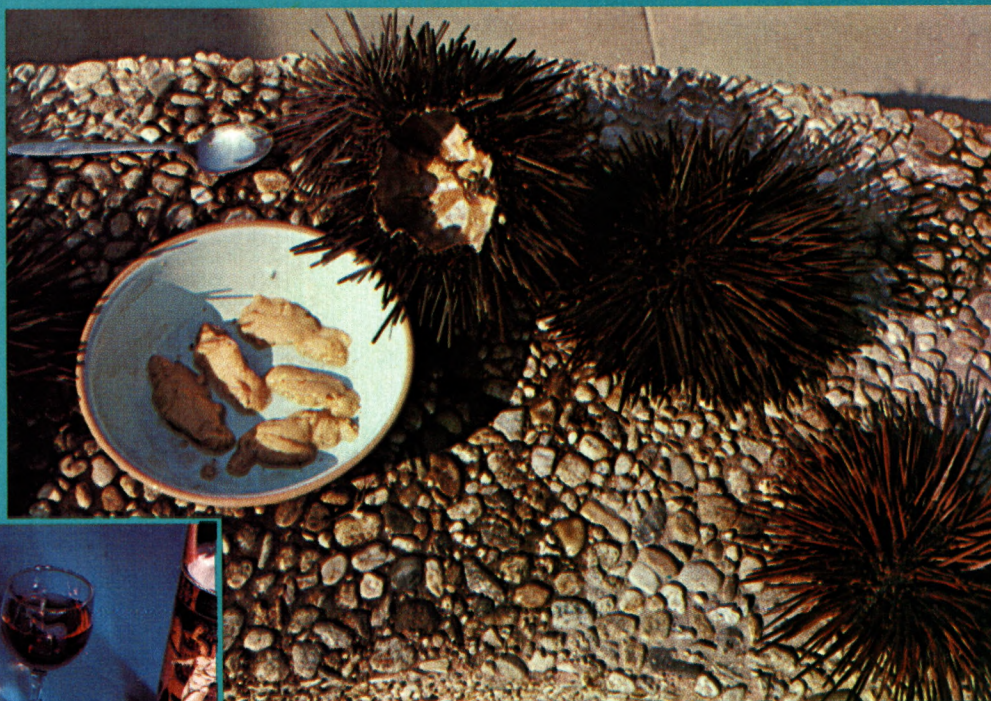
From the boats, urchins are taken to processing plants, which have been paying 10 cents a pound for them. At this rate, most divers can clear \$1000 a week. At the processing plants, sea urchin roe is quickly removed from the shell, cleaned, and packed in little wooden crates. Some of it is distributed throughout the United States to specialized Japanese restau-

rants. Large quantities of urchin roe are shipped daily to Japan where fresh roe has been prized for centuries. Air-freight costs are phenomenal, but in Tokyo, the roe brings \$3 to \$5 per pound. As much as \$20 a pound has been paid for the California roe.

Dollars are big, but the difference between winning and losing is very small. To win, timing is essential. The successful processor constantly watches the weather in Japan, for bad weather keeps Japanese divers in port, especially during the

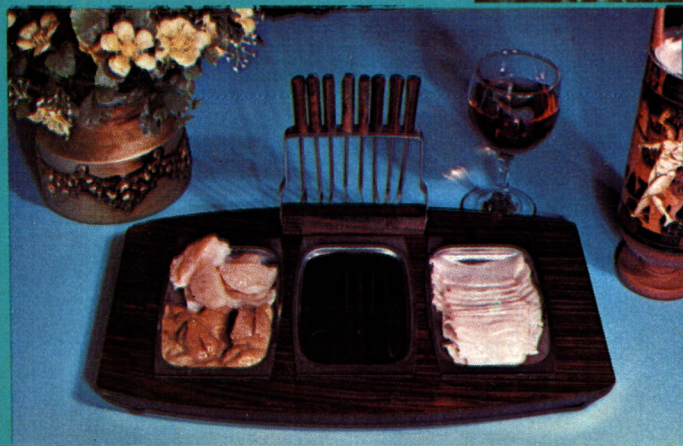
winter months from September through March. As bad weather continues in Japan, more fresh urchins are needed from California to satisfy the demand. Japanese holidays also cause a greater demand for urchins. California urchins are most desirable because they are more delicate. Eight to ten will usually yield about a pound of roe.

In modern Japan, sea urchin roe is a coveted and expensive table delicacy served mostly as "sushi," a rice ball, or roll, on which the roe is used as a topping.



PAUL J. HILL

The sea urchin is a prickly nuisance to the unwary diver; it is also a gourmet delicacy in many countries, and the basis of a multi-million dollar industry.





Another specialty is sashimi which consists of thin slices of raw fish or bits of seafood, and sometimes urchin roe. It is eaten by dipping the pieces in shoyu (soy) sauce blended with wasabi (green horseradish).

Urchin roe is also eaten boiled or raw with a little lemon, or used as a soup. Roe is also often placed on a shell and heated. A customary way of preparing the roe in Japan is to mix it with salt, or alcohol and salt, and make a paste similar to anchovy paste, only much better. The salt preserves the roe while it is stored, usually in very attractive special jars. This paste is then used as a relish, eaten with rice or mixed with other seafoods. The paste can be made by forcing urchin roe through a sieve or using an electric blender.

The big demand for fresh urchin roe also exists in other countries. Additional markets for California urchins are gradually opening in France, Italy, Chile, and Hawaii. To gourmets the world over, the sea urchin is a delicacy of fine quality; indeed, many epicures consider it to be one of the finest foods to come from the sea. Urchin roe is of excellent flavor and is extremely healthful, and some even consider it an aphrodisiac.

Sea urchins have been used by man as food since ancient times, especially

around the Mediterranean and in tropical countries. Ancient Greeks and Romans also used urchins as food, together with oysters and clams. Apicus, a Roman who lived about 2000 years ago, wrote the Western world's oldest cookbook, and included a recipe for fricassee of sea food containing urchins. Urchins are still much in demand today by the modern Greeks and Romans.

In Paris, when oysters are out of season, urchins take their place on hors d'oeuvre trays at oyster bars. In both Italy and France, seafood specialty cafés serve an iced silver platter of shellfish along with a fish entree. This platter is served year round, but in the late fall months, one of the seafoods will always be a fresh sea urchin. This, for two, with a bottle of wine and a couple of bites of sherbet, may set your travel budget back \$25.

If you look around to see how French diners tackle the raw sea urchin, you will see them nip bites with a tiny silver fork, dipping each bite in a cup of vinegar and chopped onion. Some will scoop it up with buttered morsels of bread. When the last bite has been eaten from the shell, the diner's hand lifts the open shell and sips the shell dry as if it were a cup of tea. (If you can perform that nifty little trick in com-

posure, without choking, then you deserve a gold star on your U.S.A. passport.)

Sea urchins are also in season in the West Indies during the late fall months, as they are in France and Italy. The Barbados Hilton prepares a dish called "Sea Eggs—Fort Charles." This calls for an urchin roe stuffing made with onions, chives, thyme, butter, hot pepper, lime juice, and white wine piled over diced tomatoes and prosciutto ham in pastry shells, topped with Swiss cheese and browned under the broiler.

MEDICINE AND THE URCHIN

Even the medical world has a great demand for sea urchins. A continuous supply of urchins are necessary to support large research operations. Much of the research concerns serious problems such as cancer, abnormal development, and the means by which our genes operate. Urchins have unique biological features for studies of how gene control operates in higher animals. One of the most thoroughly researched anti-tumor and anti-cancer substance comes from urchins and other echinoderms. This substance was able to suppress or completely inhibit skin-cancer cells grown in tissue culture at Osborn Labs in New York.

As a medicine, some Frenchmen drink

a half glass of an urchin's perivisceral fluid a day to help digestion. (Try it sometime and see what it does for your stomach.) Even Pliny who lived way back in 23 to 79 AD recommended sea urchins for many ills such as ulcers, tumors, and kidney troubles. Galen, Athenaeus, and other ancient writers also speak of the sea urchins' value as a medicine. On the other hand, there are a few modern Americans who suffer from gastrointestinal distress as a psychological result of watching someone else eat urchin roe!

URCHIN DESCRIPTION

If you intend to join the big urchin rush, then you may want to know what they are, what parts are edible, and when they are best to eat.

The word "sea urchin" comes from the old English name for the spiny hedgehog. Urchin roe is more appropriately called "sea eggs" in the West Indies and some other countries. Sea urchin is also known as "oursin" in France, "ricci di mare" in Italy, "chardon" in Martinique, "terong-terong" in Malaya, "seeigeln" in Germany, "echini" in Greece, and "uni" in Japan.

Sea urchins are Echinoderms, which include starfish, brittle stars, and sea cucumbers. Urchins are globular in shape and covered with movable spines which give them the pin cushion appearance. Generally, sea urchins are characterized by their tube feet, calcareous skeleton, and radial symmetry. Radial symmetry means that the parts of the body are radially arranged around the center region in which the mouth is located. The skeleton is usually referred to as a shell, but is more accurately called a test. The mouth, on the underside,

is a five-toothed chewing apparatus called "Aristotle's lantern." It is named after the philosopher who first described the structure and pointed out its resemblance to an ancient Greek lantern. Inside, nestled against the test are the parts we are most interested in, the five golden yellow egg sacs, or roe.

The egg sacs are attached to the inside perimeter of the test with their five points meeting at the top and becoming larger as they radiate out. Each egg sac has a shape somewhat similar to an orange segment. Egg sacs of a ripe urchin may represent two-thirds of its total tissue weight. Eggs are at their best when they are full and orange colored. However, the Japanese prefer the bright yellow roe over the orange. Brown roe is used only in secondary products or discarded.

Some urchins may develop and mature their eggs in almost any month of the year. Mature eggs are passed into the water where they are haphazardly fertilized by males. After spawning, egg sacs shrink but start growing again in several days.

Sea urchins can be taken from one area with roe sacs very full. Then in an area just adjacent to the first, urchin egg sacs can be thin and sick looking. With variables like these, it is best to record roe sizes in a log book at various times and places in order to find mature roe.

URCHIN DISTRIBUTION & IDENTIFICATION

Sea urchins are very abundant in all seas, where they may be found either attached to rocks or on muddy or sandy bottoms. They are found from high tide pools down past 100 feet, some even

extending to the abyssal regions. North America is well supplied with sea urchins and all are edible.

The most popular urchin and the one causing the sea urchin gold rush in California is the giant urchin, *Strongylocentrotus franciscanus*. Its color ranges from dark-purple to reddish-brown. This urchin is the largest and the best eating. The test alone often exceeds five inches and may reach a diameter of up to seven inches. The large roe is economical to process, but it is not as suitable for the "sushi" trade that caters to smaller roe. This species inhabits the Pacific from Alaska to Cedros Island off the coast of Baja California.

Another edible Pacific urchin of less importance, or rather more of a nuisance, is the small purple urchin, *Strongylocentrotus purpuratus*. It prefers a violent surf and occurs in large numbers in tide pools and shallow water. This urchin is about two inches in diameter and can grow to four inches. Its spines are thick and short. The roe is small but just as good as the giant urchin and occupies the same range.

The green urchin is occasionally eaten in Alaska, Maine, and New York. It deserves some notice, if only for the fact that it bears one of the longest scientific names applied to any animal—*Strongylocentrotus drobachienses*! Except for its color, it resembles the purple urchin. Green urchins are found on the Pacific coast from Oregon to the Arctic, and on the Atlantic coast from New Jersey to the Arctic.

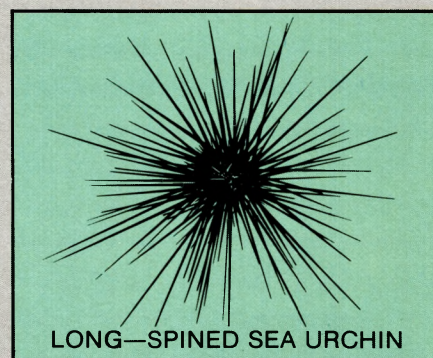
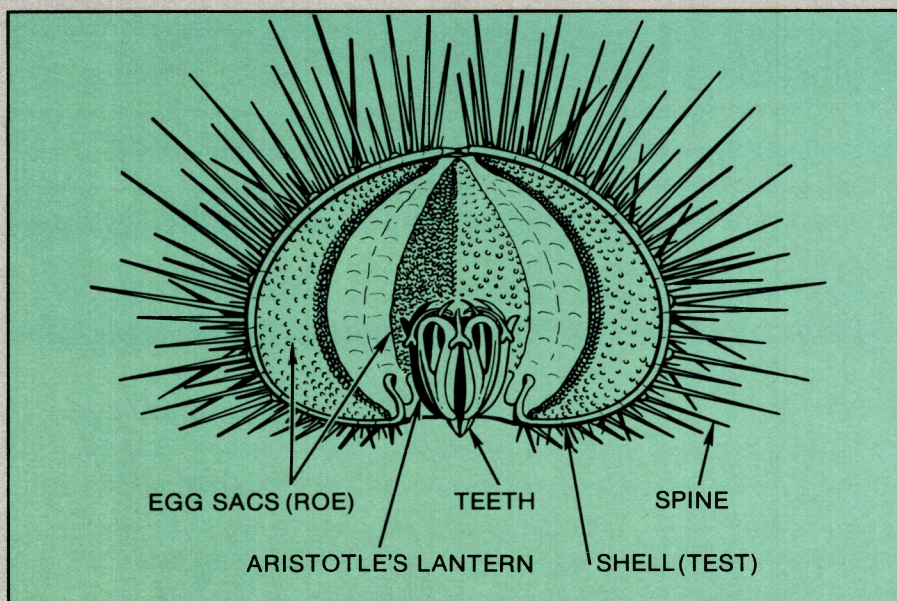
Another small Atlantic urchin that is edible, but not often eaten, is *Arabacia punctulata*. It varies in color from purple



Urchin roe is of excellent flavor and is extremely healthful, some even consider it an aphrodisiac. The Greek writer Pliny recommended it for curing ulcers, tumors, and kidney troubles.

PAUL J. HILL





to deep brown and extends from Cape Cod to the Gulf of Mexico.

A long-spined urchin enjoyed in the West Indies is found from the Carolinas to Brazil. This is the brown urchin, *Cedaris tribuloides*.

SEA URCHIN POISONING

There are no poisonous sea urchins in the waters of the United States. However, there are some poisonous urchins in the popular vacation areas of the West Indies and other countries. Urchins affected may be highly poisonous during their reproductive cycle in the spring and summer months. Eating the ovaries of these urchins will cause nausea, vomiting, and diarrhea. Male gonads do not seem to be affected. The species that are poisonous during the reproductive cycle are the white sea urchin *Tripteneustes ventricosus* from West Indies to Brazil to West Africa and the sea needle *Diadema antillarum* from West Indies. These urchins are safe to eat during fall months.

Some urchins have toxic spines. While most urchins have solid spines that are relatively blunt, many have long, slender, hollow spines that are sharp and dangerous. Urchins such as this are found in the Caribbean and other tropical waters. If accidentally bumped, the sharp, brittle spines will puncture the skin and, in most cases, break off. The spines can cause an intense burning sensation and numbness, followed by swelling and aching. Secondary infection can result. Spines of this type usually will be absorbed within several days when left in the wound. Short solid type spines of North American waters will not absorb. They are also very difficult to remove from the flesh because of their brittleness. If complete removal is desired or infection appears, medical attention is necessary.

YECCHH!

In England and United States, sea urchins are not commonly eaten. Many Americans wouldn't recognize an urchin if they saw one. Most who do, wonder how anyone can eat a sea urchin, and some use the term "yecchh!" But even the popular seafoods are low in the American diet. The average American consumes 167 pounds of meat annually and only 11 pounds of seafood, and of the seafood, 35% is imported. In Japan, the average person eats 70 pounds of seafood annually. In Iceland, the average is 86 pounds of seafood.

There is, however, a small growing market for urchins in New York and Los Angeles. Most restaurants in Little Tokyo of Los Angeles serve sea urchin in various ways, but usually as an appetizer. Many people in Los Angeles County and other areas of California also partake of this delicacy—people such as Italians, Samoans, Japanese, French, and others who, because of their ancestry, know how to prepare urchins. Many natives of California have learned from these people and now enjoy sea urchin roe—among this growing clan, of course, are a few scuba divers.

Recently, a war-chest was provided by anti-urchin factions in Los Angeles to kill urchins. Kelp forests suffer in some areas due to the hordes of sea urchins that eat tiny new kelp buds, preventing their growth into mature plants. It was reasoned that by killing the urchins, the kelp beds would grow more dense. Urchin-killers dived on reefs; smashing, mashing, squashing, murdering the bristly little shellfish.

Urchins died by the thousands, unmourned by their killers. The slaughter of urchins, however, was grieved over by Wilmington's colony of Samoans, San Pedro's colony of Italians, Gardena's



colony of Japanese, and by Frenchmen everywhere who heard of the news.

Perhaps, if we here could be educated to appreciate the delicacy of the sea urchin, the destruction of urchins would not be necessary. Granted, the spiny exterior of an urchin doesn't exactly present an invitation to dig in. But if you are repulsed by the idea of eating one, then you just haven't gone far enough with our prickly little friend. This is one of the gourmet foods most divers are overlooking.

If you have tasted urchin roe and didn't like it, give it another try. It has the consistency of thick cream, but the flavor is very difficult to describe, because each urchin is slightly different in taste. Bright orange roe of female urchins is sweet with a very slight salty flavor of the sea. Yellow roe of the male urchin is stronger in flavor, but also very good. Urchin eggs are best when they are full. When the roe is small and thin, there is a strong iodine flavor that most find undesirable.

Next time, taste one that is bright orange—not brown or yellow. If your response is still "yecchh," then try one with lemon juice or teriyaki sauce. If you just can't stomach anything raw, then try one of the recipes. Once you've found a way to enjoy the urchin, then you can join the rest of the world in an important health food and a great delicacy.

FOOD VALUE OF URCHINS

Sea urchins are near the bottom of the food chain and contain very efficient body building proteins. They are a valuable source of minerals and vitamins, and have a high content of protein, phosphorous, and potassium—and so does the algae and kelp on which they graze. Whether the early Indians knew this food was nutritious is a moot question, but, in some areas, they ate tons of the stuff and they were a vigorous lot. We divers should be so rugged!

This delicious food is abundant, easy for the diver to get, and simple to prepare for appetizers, hors d'oeuvres, or main dishes. The only problem is finding written instructions for preparing them for the table. So I would like to pass on some tested recipes to you and dispel any idiosyncracies you or your family may have about indulging in this beneficial fare.

Start by getting a copy of "The Edible Sea" at a dive store or book store. This book will be invaluable to you for identifying and preparing various seafoods as well as sea urchins. If you can't find the book at a store, you can order it from Educational Services, P.O. Box 15145, Long Beach, CA 90815 for \$14.95.

CLEANING SEA URCHINS

The following method is for removing the roe from the shell:

1. Turn the sea urchin on its back with the teeth, or mouth side up. Wash off any sand. Be prepared for a purple fluid that will be released and can stain your hands for several days. The stain can be partially removed with lemon or lime juice.
2. There are several ways to open an urchin. If you have many urchins to clean, you can use a diver's knife or any heavy knife to split the urchins open down the middle of the shell. Splitting is faster, but may damage several of the roe sacs. If you do not want to damage the roe sacs or the shell, you can open the shell by carefully tapping all around the mouth with a hammer, using a light touch. Tap enough of the shell away to allow dumping the watery viscera and removing the roe. If you want to brave using the juices for cooking purposes, pour the contents through a strainer.
3. Remove the yellow roe sacs by scraping them out with a tablespoon, bamboo rice paddle, or your finger. Carefully remove one at a time.
4. Wash each roe segment under a small stream of cool water and remove any loose purple membrane that adheres to it. The roe is now ready for eating. The roe may be frozen for future use by sealing it in a plastic bag or airtight container. Pour urchin juice over the roe to help seal out air.

The following method is generally used to clean small urchins for eating the roe out of the shell:

1. Wash urchin. Remember the stain.
2. Hold urchin upside down (mouth up). With small scissors or sturdy knife, cut out the mouth and part of the shell.
3. Pull out the fragments. Turn urchin over and dump viscera (watery contents). Carefully rinse inside of shell with cool water. The roe is ready to eat.

BOILED URCHINS

Boil whole unopened urchins in salted water to cover about 3 minutes over a low heat. Remove from water. Cut out mouth. Drain entrails, leaving yellow roe in shell. Dip pieces of buttered bread or toast into the roe around the inside of the shell. In Marseilles, the urchins are enjoyed raw this way. So if you're not squeamish, skip the boiling. It's messy anyway.

BARBECUED URCHINS

Whole live urchins may be thrown into an open fire and cooked until the spines burn. However, the hot urchins will burn your fingers when you try to open them. The best method is to open the urchins at the mouth before cooking. Don't drain the juices. Barbecue about 10 minutes. After cooking, the juices may be discarded or sipped from the shell. The roe is eaten from the shell with fork or fingers. Dip in lemon juice or teriyaki. The roe is also good with potato chips or corn chips. If you are hungry, skip the barbecuing.

URCHIN MUSHROOM CREAM SAUCE

1/2 cup urchin roe
1 can (10 3/4 oz.) condensed cream of mushroom soup
1/2 cup milk
Force urchin roe through sieve and blend with soup and milk. Heat to boiling, stirring constantly. Pour over hamburgers, chicken pieces, other meats, or vegetables. Good served over asparagus and sprinkled with cheese.

URCHIN MUSHROOM CREAM DIP

1 cup urchin roe
1 can (10 3/4 oz.) condensed cream of mushroom soup
Force urchin roe through sieve and blend with soup. Use as a dip or spread on crackers for hors d'oeuvres. So good that you can't stop at one.

OTHER RECIPES

By experimenting, you will find other uses for sea urchin roe such as for fillings, spreads, dips, sauces, soups, and dressings. By adding urchin roe to butter, mayonnaise, or other soups, more recipes can be created. Don't forget to try some of the Japanese and French methods of eating urchins mentioned earlier. Also, more recipes and interesting reading can be found in "The Edible Sea."

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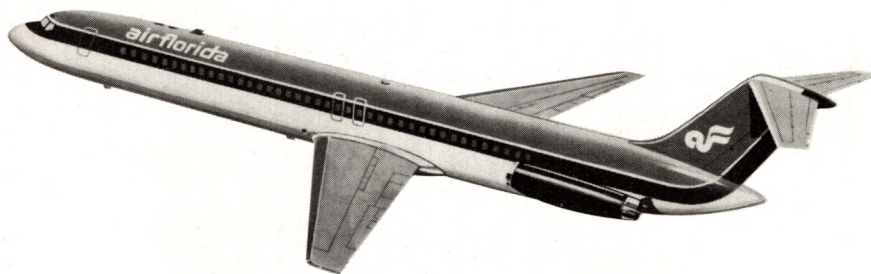
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Instructor Notes

by Bret Gilliam



RICHARD H. STEWART

What Really Is Advanced Equipment?

What constitutes advanced gear for a scuba diver? I think that all of us would definitely place such apparatus as semi-closed circuit mixed gas rigs in the advanced category; likewise, I think that we should consider special composites of scuba gear designed for a specific application (such as cave diving penetration) in the advanced group. But let's look a little closer.

Do you think that a modern buoyancy compensator is advanced equipment? I certainly hope not, because it is one of the basic parts of the sport diver's scuba outfit. Let's also remember that it's still a buoyancy compensator whether the device is worn around the neck or on the back.

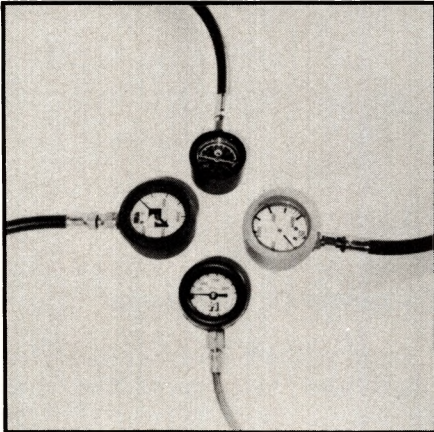
Some writers have gone so far as to say that an instructor is remiss in his duties to students if he does not introduce the class to modern buoyancy control systems in their basic training. Use of low pressure inflators is now taken almost for granted by most professional training facilities and instructors. We can't consider inflators advanced equipment, can we? Please, don't blame the abuse of such devices as a substitute for watermanship skills, that's the fault of the instructor, not the product. Modern BC's make diving easier and safer. Period!

Is a submersible pressure gauge an item of advanced gear? Let's not think that this instrument is anything less than an indispensable functioning part of the regulator. To attempt to train basic students in the open water environment without such a basic safety monitor is

Can diving hurt your hearing?

continued from page 33

"The basic diver is at the instructor's mercy."



probably criminally negligent, or at least darn crazy!

Well, how about that old lifesaver: the extra second stage or "octopus"? I might give way to the argument that such items could be considered as "accessory equipment", but I'm sure that most of us now recognize the undeniable evidence that everyone should be using an octopus.

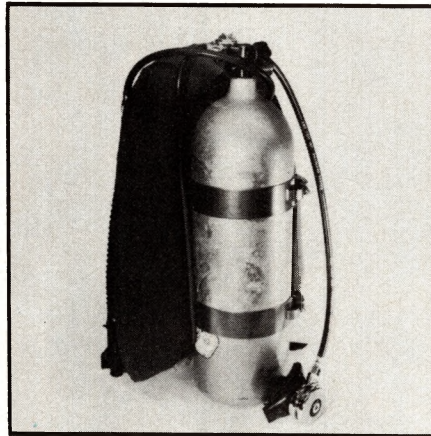
We all know that we need a good watch and depth gauge, knife, weightbelt of some sort, snorkel, mask and fins, and probably a wet suit. So, just exactly what is advanced equipment? I don't know, but I would like to be enlightened.

As a resort divemaster I come into contact daily with sport divers and instructors from all over the world. Sadly enough, our staff has found that many

divers are poorly equipped. Worse than that, many of them are downright militant about it. Most of these people are fairly well-schooled in waterskills, but at some point their instructor really turned them off to using modern equipment as a tool.

So, here is a diver on a drop-off wall wearing a dinky CO2 vest with nothing but a tiny oral inflator, and he insists that he doesn't want anything to do with gadgets such as submersible pressure gauges. Sound incredible? It happens every day in our business and at a score of other dive resort locations.

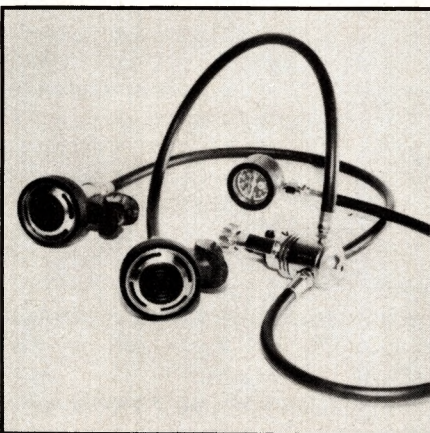
What do you do? You supervise them as best as possible and very nicely try to steer them into the right attitudes. If



they don't respond . . . you give up. It's not our job to re-educate and train everyone else's students.

There has to be a happy medium between these two schools of thought. The basic diver is at the instructor's mercy; if we don't teach students the proper way in the first training experience then the diver is on the way to becoming what Glenn Taylor at UNEXSO has aptly termed as an "irresponsible diver".

Let's see if we can all do our part to be as open-minded as possible and give our students the best well-rounded education that we can...and help make "irresponsible divers" a vanishing breed. All the resort guides will love you for it!



Sport Diver

transmitted to you through a set of earphones while the audiologist records your hearing ability in the different frequency ranges. At many universities and community speech clinics, these tests are provided for little or no fee.

If you are starting to suffer a high frequency hearing loss you should probably stop diving. Otherwise there is the possibility of becoming completely disoriented underwater, or going completely deaf in the affected ear. In rare, extreme cases death may result from meningitis or other diseases that can be contracted from perforated eardrums and other abnormalities.

You should never dive when you have a cold or any sort of ear infection, Dr. Mullin says, since the pressure may create all sorts of problems. A small pin-hole (fistula) may develop which could result in a leak, causing fluid to ooze out of the inner ear. This too could result in a severe hearing loss, dizziness, tinnitus, (ringing or buzzing in the ears), and if ignored, it will lead to permanent hearing loss.

What about diving with a cold or a sinus condition if you use drying agents to eliminate excess drainage? A qualified yes to this. Some drying agents may cause dizziness and should not be used, they can be dangerous while diving. Others do not cause dizziness and may be perfectly sound for you medically.

"Any diver who uses common sense should never have any trouble with his hearing. The occasional sport diver has little to worry about. It's the professional diver who is most likely to encounter real hearing difficulties. Of course the sport diver will too, if he ignores ear infections and does not have his hearing checked periodically," Dr. Mullin reports.

Diving can damage your hearing just as it can damage any part of your body — but only if you are foolish enough to let it.

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IQ9

IQ9, the Ninth International Conference on Underwater Education will be held in Miami Beach, Florida, September 29 - October 2.

Twelve-hundred divers, instructors, retailers and manufacturers are expected to participate in this annual get together at the Americana Hotel.

Fifty exhibit spaces have been set up and they'll be manned by representatives of the manufacturers, and travel and service companies. The manufacturers will be demonstrating their latest gear in the Americana's swimming pool, and attendees are invited to test the equipment where it counts: underwater.

Friday evening there will be a social session in the exhibits area, and there will be a wine and cheese session at the close of the technical session Saturday. During this second social Mike Kevorkian will present NAUI Service Awards, NOGI Awards, and the Greenstone Diving Safety Award.

Thirty papers will be presented by speakers at the conference, and these promise to be very interesting and will contain a lot of new information on the sport. *The Proceedings*, the official conference document, will contain these papers and may be obtained in advanced or at the conference itself.

In addition the photo contest will come to a conclusion during IQ9. Winners in the three areas of competition will be selected by vote of the attendees, and cash prizes up to \$200 will be awarded. The three categories are: black and white prints suitable for the cover of NAUI News; artistic slide shows illustrating the beauty and excitement of diving; and educational slide shows teaching a concept.

Two separate conference registration packages are being offered: The complete package includes conference registration for 3 days, admittance to exhibits and all technical sessions and debates, Friday exhibit area social including two drink tickets, admittance to all pool sessions, Saturday awards, wine and cheese social and two drink tickets, one copy of *The Proceedings*, eligibility for drawings to be held for equipment. Cost is \$60.

The basic package consists of conference registration for 3 days, admittance to all technical sessions and debates, Friday exhibit area social including two drink tickets and admittance to pool sessions, eligibility for drawings. Cost is \$40.

One day tickets will be available for Friday, Saturday or Sunday. For tickets or information write: IQ9, P. O. Box 630, Colton, CA 92324.

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FLORIDA'S SPRING

Story and photography by
Ned DeLoach



After crossing the S-51 bridge over the Suwannee River, we turned to the right on the first paved road as our guide book instructed. Following 2.6 miles of curves we took a small dirt road to our right. This ended shortly in a clearing set in the midst of a thick woods of pine and oak. We got out of our car and walked across the clearing toward a depression ahead.

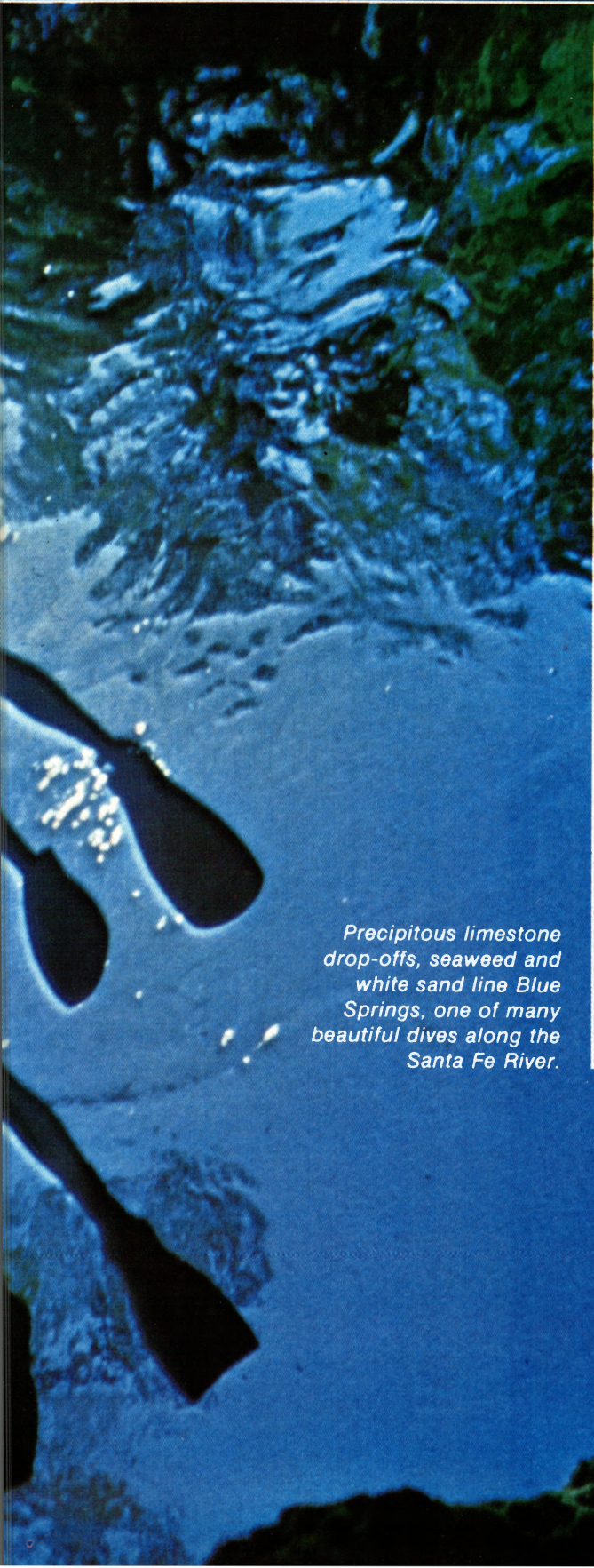
Looking down from a rugged limestone cliff we saw our first Florida spring: a large pool of the clearest water imaginable. Neither of us talked as we stared down the cliff and through 60 feet of water to some scattered tree trunks resting on the bottom. The only movement came from a few panfish circling just under the surface. My first thought was of the natural beauty of the water and its magnificent setting. My second thought was gearing up as quickly as possible for a dive.

For years divers from across the U.S. and Canada have been traveling to Florida to dive the



A group of cave divers make their final preparations for a penetration dive (above). Free diving is a great way to stay wet after your tanks are empty. At left, a couple snorkels the crystalline waters of Devil's Eye Spring.

DIVING COUNTRY.



Precipitous limestone drop-offs, seaweed and white sand line Blue Springs, one of many beautiful dives along the Santa Fe River.

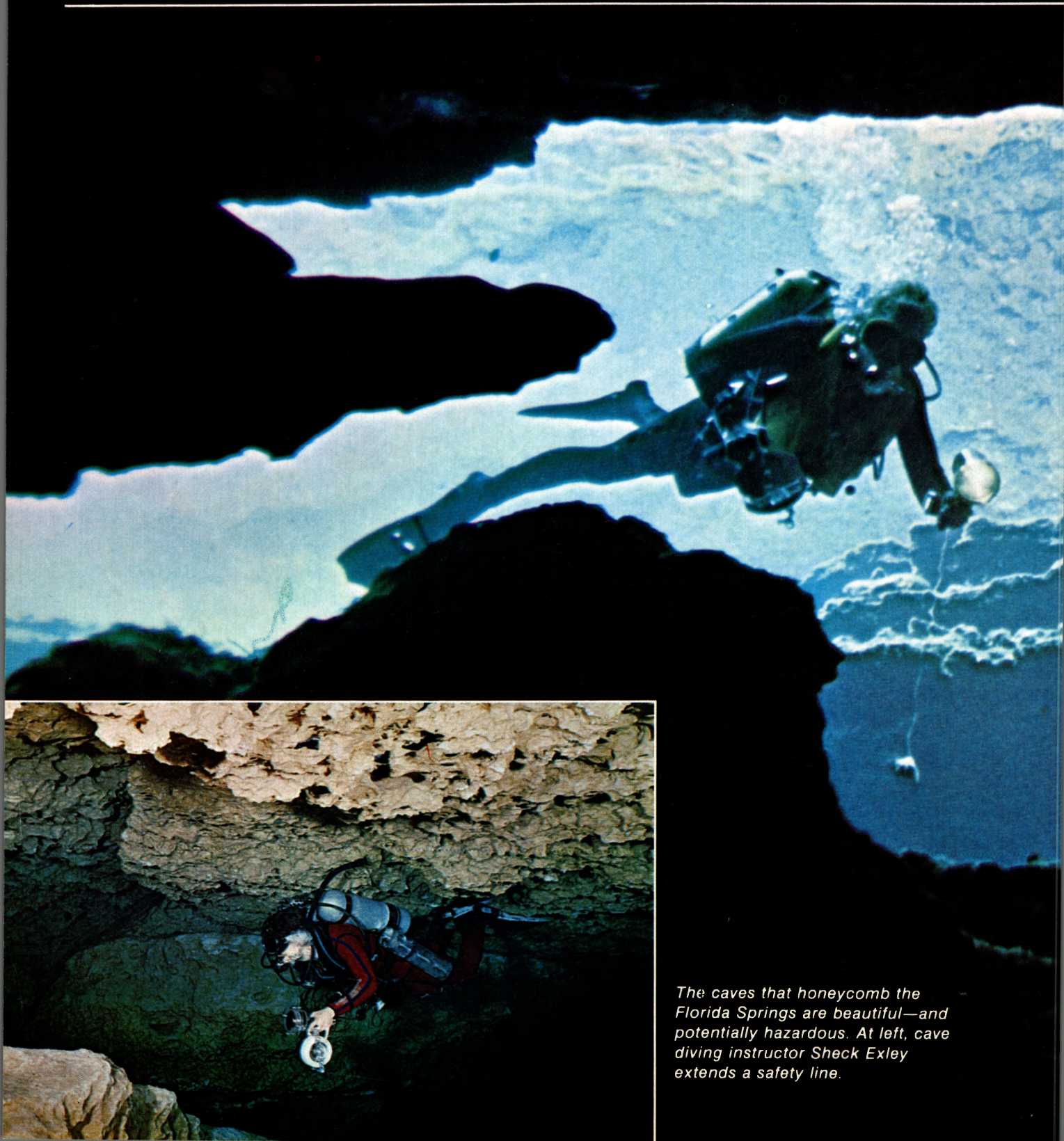


many freshwater springs scattered over the northern and central sections of the state. They have each taken home stories and pictures of clear water and exciting diving adventures. Today Florida's spring country has become one of the most popular recreational areas in the United States.

Unfortunately Florida's springs have received negative publicity in recent years associated with the drownings of untrained cave divers. This

publicity has caused a misunderstanding about spring diving by sport divers and instructors alike. The term "spring diving" has been replaced with "cave diving". These people do not understand that nearly all spring diving takes place in open basins which are considered extremely safe for open water diving because of their large volume of clear water with no current or great depths.

Florida has the largest concentration of clearwater springs in the world. If one were able to

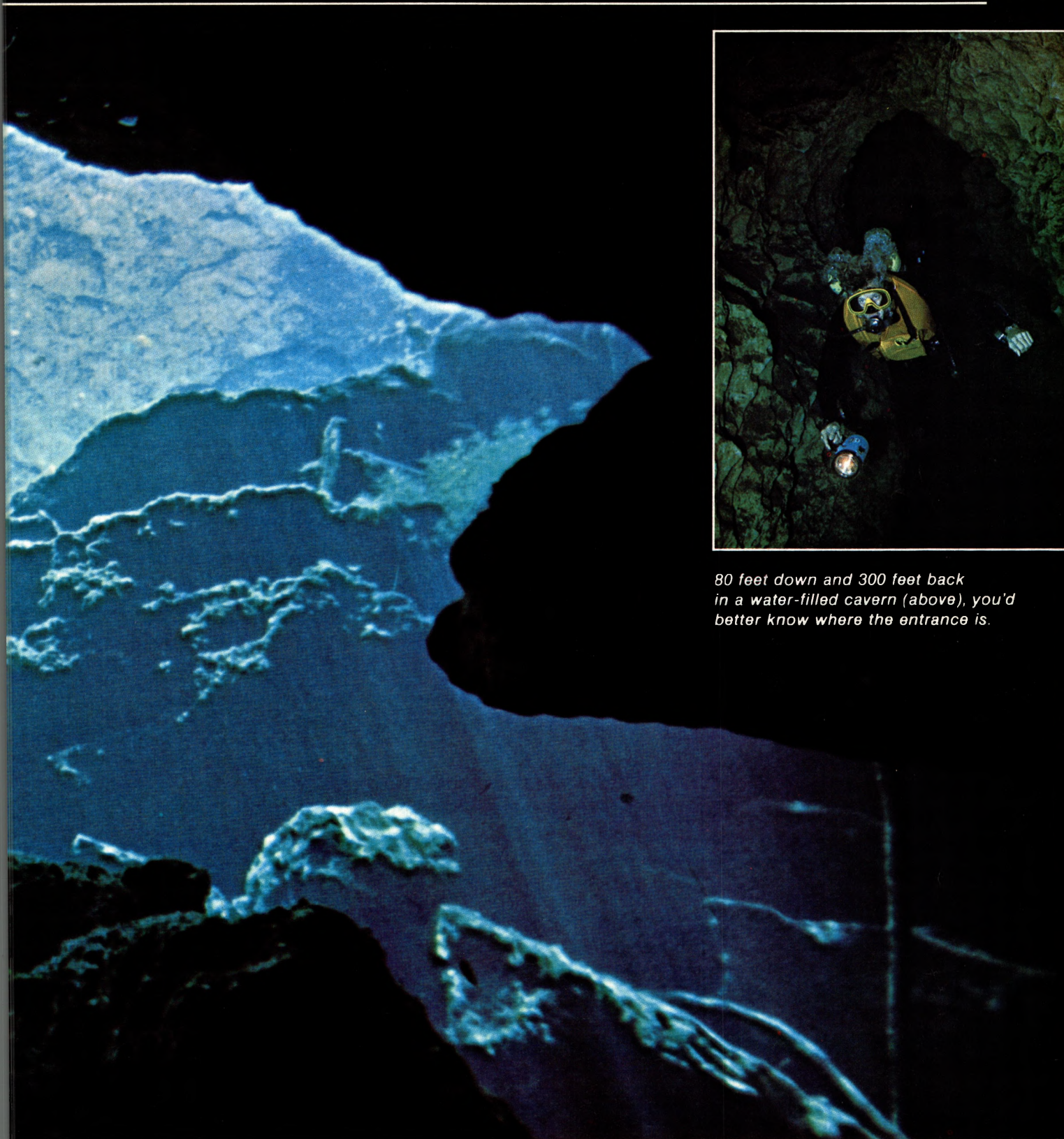


The caves that honeycomb the Florida Springs are beautiful—and potentially hazardous. At left, cave diving instructor Sheck Exley extends a safety line.

take a bird's eye view into the limestone bedrock of north and central Florida, the state would resemble a broken mirror with thousands of underground rivers flowing in every direction. Where these subterranean rivers break to the surface they fill large basins with their clear cool water. As the water continues into the basin, the overflow is channeled into a stream, called a *run*. The size of these streams depends on the amount of water being issued from underground. It can vary

from a very small flow to as much as 500 million gallons of water a day. The run from the larger springs form clearwater rivers that wind for miles through the woodland. Although the water temperature of the different springs varies, usually from the upper 60's to the mid 70's, it will remain constant in an individual spring area throughout the year. These mild temperatures provide comfortable year round diving.

Sink holes are formed when the surface layer



80 feet down and 300 feet back in a water-filled cavern (above), you'd better know where the entrance is.

of porous limestone collapses into an underground river. These water-filled depressions have no run. The water entering the pool is simply siphoned back underground as the river continues on its course.

Florida's spring country offers a new and exciting diving vacation with an almost unlimited amount of underwater recreation. Each spring is a unique wonder. From deep sink holes bordered by bold cliffs and large ledges, to shallow blue pools filled with thousands of fish and beautiful aquatic plants, the diver finds himself with thrilling exploration sufficient to last for years.

Besides general scuba and snorkeling, the springs provide the sport diver with many exciting underwater activities. The superb clarity of the water, usually 100'+, make them ideal for underwater photography. The limestone cliffs, crevices, and cave entrances create spectacular settings for either color or B&W shots. Most of the fish are accustomed to divers and can easily be approached.

Divers can also spend many interesting hours studying the underwater ecological systems of the springs. The abundance of clear water makes Florida among the few places where freshwater habitats can be observed firsthand. The springs located near rivers have become the homes of many saltwater fish and mollusks that combine with freshwater varieties to make up an interesting underwater community. At Crystal River springs on Florida's west coast it is common to see many species of both fresh and saltwater fish swimming around the boil. In the winter large manatees come into the area and are a real attraction.

Throughout the ages the white sands of the springs and the limestone bottoms of the clear rivers they feed have become a treasure chest of relics dating from prehistoric times through the development of man. Mammoth and bison bones, giant shark's teeth, arrowheads, stone fishhooks, claypipe bowls, old bottles and coins, and a vast assortment of other relics that trace Florida's development lie hidden, waiting to be uncovered by the patient collector. Outstanding collections of relics discovered underwater over the past several years can be seen at Dale Stone's Aqua Shack located on US 27 between Branford and Fort White, Barry Kerley's North Florida Divers Supply in Tallahassee, and Hienz Robertson's Skin Diving School in Marianna.

Night diving is also a popular activity. The safety of night divers is easily maintained because of the limited territory and the superb water clarity. The white limestone walls and sand bottom help reflect the diver's lights for better observation. Fish can easily be approached as they lie motionless around the bottom and under the covering of a bed of lily pads.

Florida's underwater cave systems are the most extensive and readily accessible in the world. For the properly trained and equipped diver they offer a real

adventure. For the untrained they are often deadly. Anyone interested in underwater cave exploration should first take a sanctioned cave diving course from a nationally certified cave diving instructor. The National Association for Cave Diving regularly schedules cave diving courses throughout the country, with special emphasis in Florida. Persons interested in these courses are urged to contact Sheck Exley, 1150 S. Lane Ave., No. 118C, Jacksonville, Florida 32210.

Ledge diving, which involves a short cave penetration of less than 25 yards and within natural light of the cave entrance, offers those divers who are not properly trained in the advanced technique of cave diving an adventurous and safe underwater experience.

Camping around the springs has become quite popular during the past few years. Many of the commercially operated springs offer sites for truck campers and trailers with complete hookup facilities. Blue Springs and Ginnie Springs located on the Santa Fe River, Salt Springs, Silver Glen Springs and Juniper Springs located in the Ocala National Forest are a few of the commercially operated campgrounds found near the springs.

One of the new trends in the spring country has been the combination of a diving and canoeing vacation. Divers have learned about the adventure of canoe trips down the Suwannee and Santa Fe Rivers. They can be planned for a few days or only an afternoon. While paddling down a river, you can easily locate a spring where its run empties into the river. You can spend as long as you like diving a spring, and then continue downstream searching for new areas.

Although springs are scattered throughout the north and central portions of the state, they usually appear in close proximity to one another. This makes it convenient to dive several spring locations in a single day. The following is a brief rundown of the four major areas of Florida that make up spring diving country. A few of the most popular diving locations of each group are listed.

BRANFORD — HIGH SPRINGS AREA

There are over 50 diveable springs and sinks located within a 25 mile radius of Branford.

Troy Spring, located six miles northwest of Branford, offers a large open area with depths to 80 feet. At the end of its run near the Suwannee River lie the broken remains of the old Suwannee River steamboat *Madison* which was scuttled in 1863 by her Captain who abandoned her to lead a company of Confederate soldiers to Virginia.

Twenty-two miles northwest of Branford is the Peacock system with fifteen springs and sinks grouped within two miles of each other. These offer one of the most extensive cave systems ever traversed and mapped. There are also plenty of open areas and ledges to explore. Unfortunately this area is not always open to the public. It would be advisable to check with one of the local dive shops about their accessibility.



FLORIDA'S SPRING DIVING COUNTRY.

Ichetucknee Springs, ten miles west of Branford, is one of Florida's true delights. Two large head springs feed a crystal clear run that winds over five miles through virgin woodland to the Santa Fe River. The state now owns and operates as a park the springs and three miles of their run to the bridge on US 27. Although most visitors to the park float down the run on old tubes and rubber rafts, divers enjoy snorkeling the run, studying the underwater beauty, and searching the sands for fossils and relics.

Just west of High Springs is a group of ten picturesque springs on the banks of the Santa Fe River. The most popular dives of this group are the Ginnie and Devil's Eye Springs which are now part of a diving and camping park. During periods of low rainfall the Santa Fe itself will become clear for miles, providing the underwater relic collector with bountiful hunting grounds.

PANHANDLE AREA

Morrison Spring, located just south of Ponce de Leon, is by far the most popular dive site in northwest Florida with its large basin and depths to 90 feet. There are two caves offering excellent ledge diving.

Just north of Ponce de Leon is Vortex Blue Spring, a large commercially operated diving park. The head pool is 200 feet across with depths to 50 feet.

North of Vernon are Boston and Cypress Springs with fascinating underwater and topside scenery and some of the world's clearest water. Both are difficult to reach because of poor roads but are well worth the trouble.

Marianna boasts Merrit's Mill Pond, a beautiful clear lake fed by four springs. Both banks are lined with large cypress trees, creating a picturesque locale. Average depth of the lake is 15 feet. The bottom is covered with patches of aquatic plants; fish are plentiful.

The artifact hunter will find the nearby Chipola River a good source of arrow points, shark's teeth, and many other collectors' items.

WEST COAST

Many large and interesting springs and sinks dot the west coast from the town of Crystal River to Tampa. The most popular area is the Crystal River springs.

These have to be rated as the finest freshwater dives in the world. The springs are located in the river on the north side of Banana Island, and can only be reached by boat. Boat rentals are available at the Aqua Peer Dive Shop, Paquet Boat Dive Shop, or the Plantation Inn Dive Shop. From any of these shops it is only a short trip to the springs area along banks covered with dense tropical foliage. As the springs are little affected by wind, rain, or tide, the diving is always good with 100'+ visibility. The underwater photographer will be in paradise among the bold cliffs and crevices. Silhouette shots are spectacular. Fish are always on hand and easy to approach.

As you continue down US 19 toward Tampa, you will pass Palm, Edward's, and Blue Sinks; all are large, deep and exciting dives. Due to the depths involved they must be considered advanced dives.

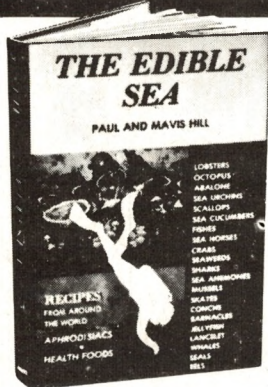
CENTRAL FLORIDA

More than a dozen beautiful springs can be found north of Orlando. Most of these sites are commercially operated but do allow scuba. Blue Springs near Orange City is now a state park with strict diving regulations. Fossil shells, sharks' teeth, and plenty of fish are found in the spring and its half mile run to the St. Johns River.

continued page 127

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GALAPAGOS GALLERY

THE ENCHANTED SEA



As geologic time goes, it was a recent event. Far out to sea, on a day perhaps three million years ago, the waters began to boil and shake as one great volcano after another burst into the sunlight. The cataclysmic birth of the island chain may have taken days or centuries of flame, smoke and turmoil; when it was done, there sat astride the equator some six hundred miles off the coast of what is now Ecuador a new and fascinating land.

What made these islands unique was a confluence of rather special conditions. These land masses were totally new and isolated, but had emerged at the crossroads of several great oceanic currents, the highways of life in the sea. The Humboldt Current from the Antarctic, the California Current from Panama, and the vast Cromwell current from the South Pacific all met at this remote quadrant of the Eastern Pacific.

Evidence of the cataclysmic forces which brought the Galapagos Islands into being can still be seen in the numerous lava flows. Sea lions, a variant of the California variety, bask on the white sand beaches (above).

*Story and photography
by **Carl Roessler***

THE ENCHANTED SEA



The Galapagos iguana, an amphibious reptile, is often seen underwater, eating algae. Sea anemones seem to pop up everywhere, dazzling the eyes. Spotted scorpionfish are also plentiful, but they're often indistinguishable from the rocks in which they hide (below).



Most marine life in its larval stage endures a pelagic, or free-floating, period which enables the species to spread, borne on the ocean currents. Thus, the Galapagos received larval seeding from three different regions of the Pacific. The currents brought terrestrial refugees as well, probably floating on refuse. These species found a unique condition in these isolated new islands — a total lack of competition. For millions of years Galapagos species evolved in tranquility. Perhaps the best example of this evolution is the Galapagos tortoise. On each of the main islands these peaceful browsing reptiles evolved shells of a different configuration related to how high they had to reach to forage the local greenery.

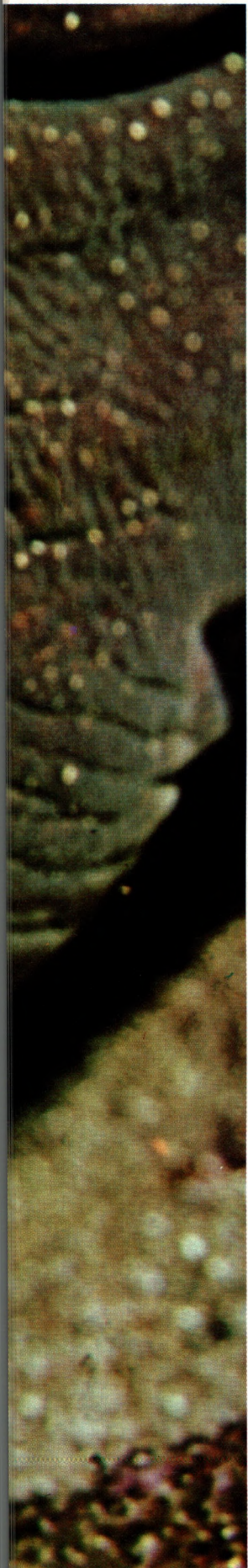




THE ENCHANTED SEA



Sport Diver



This evolution in isolation had two consequences for the island's inhabitants. First, the species diverged from their ancestors to become endemic species—creatures unique to the Galapagos. There was however, another more sinister consequence, they were inefficient competitors, and were highly vulnerable to species from outside the islands.

In 1535 the Bishop of Panama, Tomas de Berlanga, landed in the Galapagos when his ship was blown off course in a storm. When Berlanga reported the find to his emperor he marvelled at the tameness of the birds and other wildlife. In the absence of competition, many Galapagos species had never learned fear. All that was to change. Soon there came a steady stream of explorers, fishermen, and whalers. With them came their animals; soon the native Galapagos fauna was competing with rats, pigs and goats. For some, such as the tortoises, this competition has led nearly to extinction. Goats cleared the foliage higher than



The variety of aquatic life around the Galapagos seems endless. Not only are there many species present, but there are many variations of each specie. Four different forms of sea anemone and three different starfishes appear here, along with a pufferfish, sea urchin, and angelfish.



THE ENCHANTED SEA



Sport Diver



D. B. WESTFALL



The sea lions are a nosey bunch, and the females quickly swarm around divers, nipping playfully at any cameras dangling from the body. The marine life here provides the Galapagos pelicans with a diet which, for sheer variety, is probably unsurpassed anywhere in the world.

the reptiles could reach, pigs and rats dug up their eggs, and man slaughtered them for meat. From a population of over 100,000 the tortoises now number a mere 4,500, most of which live on Isabella Island.

The most influential visitor ever to land on the Galapagos was Charles Darwin, at that time a young biologist aboard the research vessel Beagle. Darwin's perception not only unravelled the evolutionary mysteries in these singular islands but, through them, the fundamental origins of terrestrial species.

Despite their tumultuous history, today the Galapagos seem as remote and untouched as ever. Scattered about the equator, the islands are a series of majestic volcanoes

continued page 66

BENEATH THE SEA

THE NUDIBRANCH

by Steve Blount

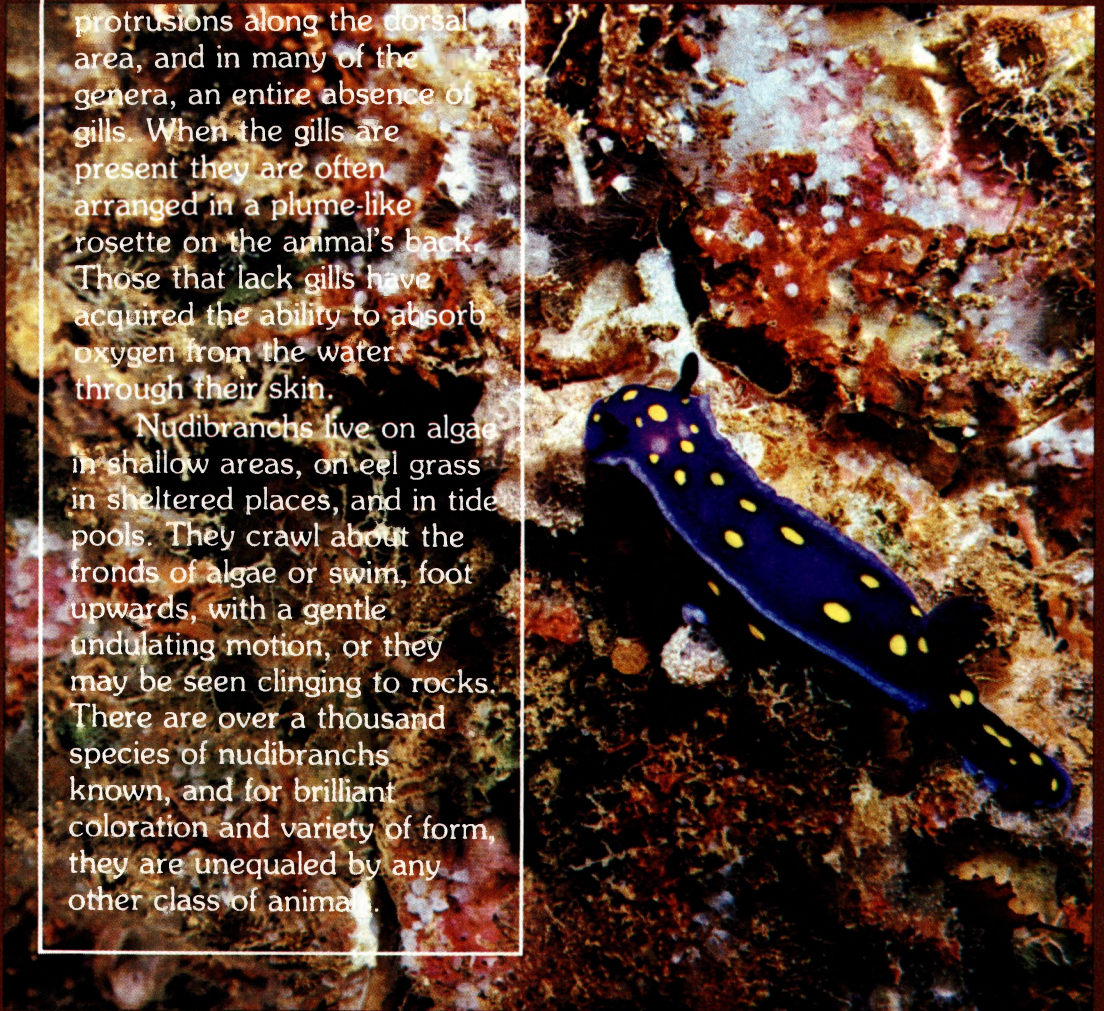
Photography by Jack McKenney

The nudibranch is commonly known as the "sea slug", but this is a tawdry title for such a varied and beautiful species. A true mollusk, these animals have lost their shells and the typical molluscan mantle.

"Nudibranch" means "naked gills", and one of the most notable features of the nudibranchs are the great number of tentacle-like

protrusions along the dorsal area, and in many of the genera, an entire absence of gills. When the gills are present they are often arranged in a plume-like rosette on the animal's back. Those that lack gills have acquired the ability to absorb oxygen from the water through their skin.

Nudibranchs live on algae in shallow areas, on eel grass in sheltered places, and in tide pools. They crawl about the fronds of algae or swim, foot upwards, with a gentle undulating motion, or they may be seen clinging to rocks. There are over a thousand species of nudibranchs known, and for brilliant coloration and variety of form, they are unequalled by any other class of animal.





Top Left
Glossodoris Porterae

Top Right
Hermisenda Crassicornis

Bottom Left
Glossodoris Californiensis

Bottom Center
Flabellinopsis Iodinea

Bottom Right
(*Tetabbranch*)

Bottom Right
Chelivonura Ineumis
(*Tetabbranch*)

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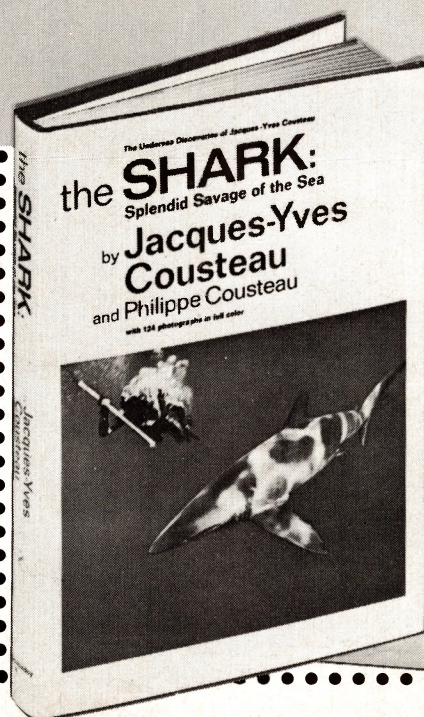
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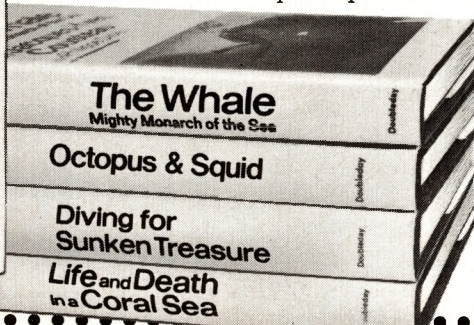
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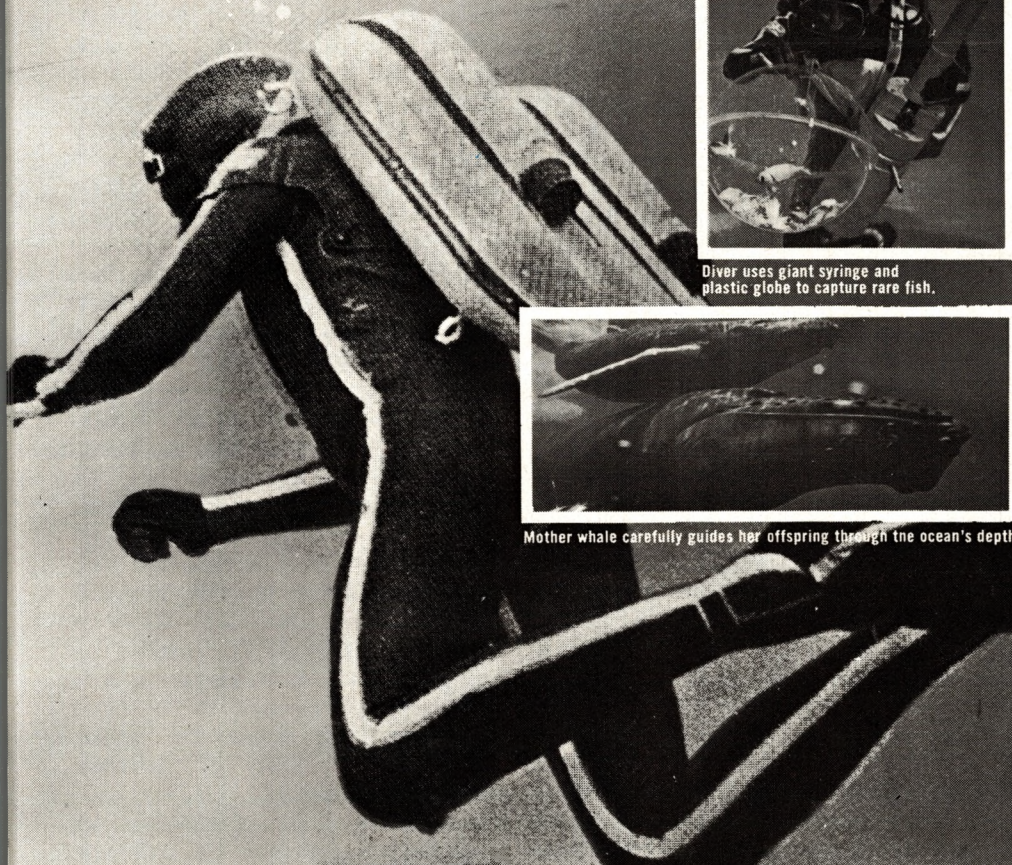
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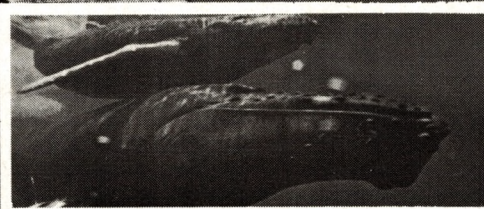


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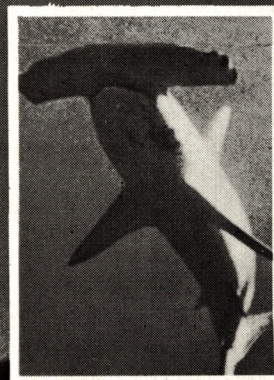
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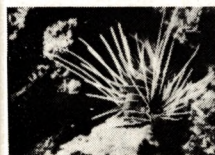
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GALAPAGOS GALLERY

Continued from page 61

whose sloping brown flanks bake in the hot sun. The largest of these, Alcedo Crater on Isabella Island, is 25 miles around its rim.

The waters surrounding the islands are filled with life, so that every dive is an incredible adventure. One need only remember that nearly a third of all inshore marine species are unique to these islands to realize that with each photograph you have an excellent chance of recording a creature found nowhere else in the world. Indeed, in my own brief visits I have photographed two species new to science, and several others previously not known to live in the Galapagos. Even the sea lions, which swim around the divers playfully on every dive, are a Galapagos variant of the California sea lion. While the big bulls bark threateningly from a distance, the fun-loving females zoom and swirl all about, rolling their beautiful liquid-like eyes, barking greetings and nipping any cameras left untended. Near islands such as Champion, Cousins and Guy Fawkes, swarms of these lively animals fill the waters, moving with the divers as if curious about these noisy intruders. These aquatic acrobats are a constant magnet for photographers, and after a while one resolves not to take any more pictures of those damned sea lions. But then, this sea lion executes a perfect somersault and . . .

While the cold waters of the Humboldt Current generally inhibit any major coral development, there are spectacular exceptions. At Champion there is a single coral complex rising some 15 feet from the bottom. However, more characteristic of the archipelago are small clusters of brightly-colored coral polyps which bloom lavishly on every lava boulder. These lushly-colored corals are found in blood-red, flame orange, canary yellow and other hues, and they blossom in the dark an exquisite carpet of color never seen by day.

Some Galapagos species, while resembling their counterparts in other seas, seem measurably larger. One example is the scorpionfish, some of which reach lengths of over two feet. Another is the porcupinefish. Once, while being carried irretrievably away by a swift current, I looked back to see an enormous porcupinefish swimming slowly away so that I had no chance to even document its size. Other fantastic thrills are the swimming birds, the penguins and flightless cormorants. On occasion I have

been 30 to 90 feet deep and had curious penguins whoosh by; and in a magnificent cave at Punta Roca Vicente I photographed a flightless cormorant paddling furiously with its webbed feet and steering with its stubby wings as it searched among the lave boulders for small fish to eat.

There are several impressive species of moray eel in these enchanted islands. Often I have photographed large green morays up to 7 feet in length. In every case these enormous eels patiently endured the annoying flashes of my strobe light at ranges of a foot or less. One magnificent specimen lay full length in a crevice in the lava wall, its entire body exposed to view. Even more striking, I discovered a pair of yellow-eyed morays whose bodies were black and white. This sobering confrontation took place 140 feet deep in a massive subsea cavern off Cousins Island.

At several dive sites such as Gordon Rocks, where the sheer lava walls plummet several hundred feet vertically downward from the surface, the diver may encounter schools of the greater amberjack, *Seriola dorsalis*. These swift wolves of the sea attain lengths of five feet and travel in swift packs which swoop by silently, leaving the diver awed at their silvery beauty.

Another richly-colored species is the white-striped angelfish *Holocanthus passer*. This extravagantly decorated fish, as well as the calico grouper or flag cabrilla, *Epinephelus labriformis* and the butterflyfish *Heniochus nigricorstris*, are obvious transplants from the waters of Baja California, some 2000 miles to the north. The white-striped angelfish live throughout the islands in great numbers, and are easily approached.

Perhaps the single most unusual underwater encounter in Galapagos inshore waters is with the primitive marine iguanas. These reptiles sit on the lava rock and bask in the sun by the hour, occasionally snorting salt from their nostrils, but otherwise remaining motionless. As low tide approaches, however, the sedentary lizards begin a massive movement into the water. Soon the surface is punctuated with undulating bodies as the iguanas swim out to their feeding grounds. The swim is not without comical hazards, for the sea lions seem to enjoy playing catch with each other, using the iguanas as the ball. After tossing it around a bit, the iguana's tormentors impatiently rush off to some other sport. The reptile thereupon single-mindedly regains its dignity and heads out to feed. Leaving the surface, the iguana swims down a few feet, finds an algae-covered boulder and spread-eagles itself upon the

surface of the rock, using its sharp claws for purchase. Thus secured, the iguana uses its plated beak to tear the algae loose and contentedly feeds.

These are but a few of the undersea wonders of the incredible Galapagos Islands. My own trips there have ranged among some twenty of the major islands. On these cruises I have encountered whales, ocean sunfish, sharks, fur sea lions (rather different from regular sea lions), turtles, rays, batfish and a host of other marine animals to delight the underwater photographer.

The greatest wonder of the enchanted islands is that between dives one hurriedly rushes ashore to photograph the long-famous terrestrial species — red-footed and blue-footed boobies, gigantic albatrosses with wingspans of up to 14 feet, tortoises, Galapagos hawks, Darwin finches, lava gulls, Sally Lightfoot crabs and dozens of other unusual land animals. Two weeks cruising in these incredible islands only scratches the surface of the experience, whetting one's appetite to return.

I look forward once again to standing on the rim of Daphne Crater looking down on thousands of nesting boobies; or walking the paths of Hood Island, the home of 12,000 pairs of albatross; or diving the coral gardens of the Devil's Crown; or night-diving the brilliant night-blooming wall of Tagus Cove; finding the elusive red-bellied batfish at Bartholomew Island or the golden sea bass near the cavern at Punta Roca Vicente; or snorkeling at sundown in the grottoes of James Bay with the lovable fur sea lions.

I have seen these many times, and I will return . . . 

McKenney Mini Film Festival

Jack McKenney will headline a weekend of entertainment October 28th and 29th, hosted by the Rockford Divers Association. McKenney will travel to Rockford, Illinois to present some of his beautiful and sensitive underwater films.

Friday, October 28th, Jack will be featured in the "McKenney Mini Film Festival". This promises to be an evening of underwater adventure with some of his very best films and slides. It's also your chance to meet Jack McKenney and ask him any questions you might have. Starting at 7:30 P.M. and costing only \$2.50, it's a bargain for everyone in the area.

Saturday afternoon the activity shifts to the famous Wagon Wheel Lodge in Rockton, Illinois. Here, displays of all types of material collected from the sea by the Rockford Divers will be on exhibit.

Photographic work, wreck artifacts, antique bottles and shells will make up these displays. Twice during the afternoon, Jack McKenney will show his films.

Saturday evening a cocktail party will precede the 8th Annual Fall Awards Banquet of the Rockford Divers Association. Mr. McKenney will act as master of ceremonies and will show three more of his films.

Come and join in this fantastic weekend. Reasonable room rates are available at several local hotels within minutes of all activities. The area is accessible from most directions by interstate highway.

For tickets and further information, contact:

Bill Steinborn
1385 Randall Drive
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Or call (815) 332-4225.

DEMA TRADE SHOW

The 1978 trade show of the Dive Equipment Manufacturers Association will take place January 14 — 17 in Miami Beach, Florida. The show will use the facilities of the Americana Hotel which is right on the ocean. The annual DEMA show is the largest of its kind in the world, and will be open from 9 a.m. to 6 p.m. each day. This one's going to be a lot of fun and you'll get a chance to check out all the newest gear. Information and booth registration forms are available from Jim Hall, DEMA General Manager, 2064 Bush Street, Santa Ana, CA 92706.

NEW OPEN WATER TRAINING MANUAL BY PADI

PADI has just released a totally new Open Water Training Manual as a replacement section in the PADI Training Manual. This new section provides detailed information on how to organize open water training dives and how to conduct the various exercises required for PADI ratings through the Dive-master level. A great deal of new information of significant interest to instructors, such as training exercises for an octopus attachment, is included. Useful to both prospective and experienced instructors, the information is of substantial value to anyone with an interest in diving instruction.

Impressive features of the new Open Water Training Manual include sections on open water organization, boat training procedures, night diving training procedures, emergency procedures for open water training, and a fantastic appendix of support forms, checklists, and information sheets.

The new Open Water Training Manual is in stock at PADI Headquarters for immediate delivery, and may be ordered by all interested. The cost is \$5.00. For a brochure with additional information, or to order the Manual, write to **PADI Headquarters, 2064 North Bush St., Santa Ana, CA 92706.**

PHOTO CONTESTS HELD

If you're into both diving and photography you should get involved with some of the photo contests that are being held. In addition to the UPIA/SPDM contest, here are three that we know of:

The Centro Portugues de Actividades Subaquaticas is sponsoring an international contest call the 1st Concurso Internacional de Fotografia Submarina C.P.A.S. We suggest you contact the group for further information. Their address is Rua Das Janelas Verdes 37, Lisboa 2, Portugal. Gold, silver, and bronze medals will be awarded in each of the five classes: General, Macrophotography, Ecological Story or Sequence, Creative Photography Black and White, Creative Photography Color. In the first two classes you may submit either black and white prints or color transparencies. The third is strictly for transparencies and the last two are self-explanatory. Entry deadline is October 31, 1977,

The Florida State Diving Association will be holding its Tenth Annual Underwater Film Festival February 24-26, 1978 in Gainesville, Florida. Inquiries should be directed to 10th Annual FSDA Film Festival, Box 12823, University Station, Gainesville, Florida 32604.

The Illinois Council of Skin and Scuba Divers has scheduled an underwater photo contest open to divers everywhere. Prizes to be awarded in the divisions are:

Best of Show - engraved plaques with ICSSD symbol

First Place - engraved awards and ribbons

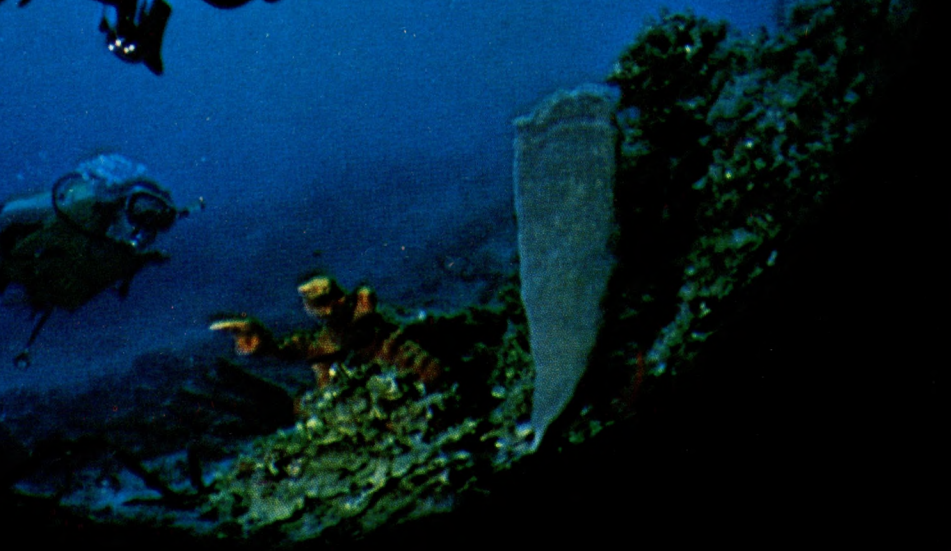
Second Place & Honorable Mention - ribbons

Additional award gift and rental certificates will be announced at the show.

Divisions are black & white prints, color prints, and color transparencies. Each of these will be further subdivided into saltwater and freshwater categories.

The entry fee for each division is \$4.00 for ICSSD members and \$5.00 for non-members. Up to 4 prints or slides may be entered in a division, division entries may be in one or both categories.

Entry deadline is January 21st, 1978. For more information and an entry form contact: Gary Chesnut, Photo Director ICSSD, P.O. Box 466, Dekalb, Ill. 60115.



Understanding Underwater Photography



Photography, whether topside or underwater, is based on one all important aspect: composition, the addition or elimination of objects within the image area, and the placement of the objects in a manner which creates an aesthetically pleasing photograph.

For centuries painters, sculptors, and architects have followed the "rules" of composition, that is the rules that applied as of the time they created. As ideas in art changed, the rules changed, and what was thought "conventional" or "acceptable" slowly evolved.

During the Greek period, many compositions were based on the "Golden Section", a mathematical formula which divided the image area into a geometric ideal, and the work was developed to fit into this ideal arrangement. Later artists introduced the ideas of the circular composition, the "Rule of Thirds" (which

divided the image into top, mid, and bottom) and other "ideals".

The camera came into general use in the mid-19th century and the formative years of photography came at a time when Romanticism and Pictorialism were the dominant artistic ideals. Although painters denied that the camera could be used to produce art, photographers of the era still followed in the footsteps of their brush-wielding contemporaries, creating images which adhered very closely to the formal rules of image-making as they then existed.

As the medium has progressed, new technology has expanded the capabilities of the camera, and the ideas about what makes a successful photograph have changed. There is no established set of rules which, if perfectly followed, will result in a perfect photograph. Photos taken in this manner

often have too much perfection and too little spirit or spontaneity.

Learning good composition is not easy or quick. One helpful technique is to study the work of someone whose photographs you like. Ask yourself why the artist chose the viewpoint presented, why this side of the subject, why this relationship between subjects. Observe the photos by leading photographers that appear in magazines. Slowly you will begin to recognize the difference between the well composed picture and a sloppy menagerie of objects. In addition, you can enroll in a course of photography, underwater or topside, and allow the instructor to guide you in the area of composition. Very simple things, like moving the camera from a vertical to a horizontal position can make a very great difference in the final print.

continued next page

Understanding Underwater Photography



A



B



C

One very important aspect of taking photographs of divers is to avoid chopping, technically called cropping, portions of the subject out of the frame. An example is photo **A**; well exposed with available and artificial light, its subject matter detailed and colorful, but cropped just a hair too close from the bottom, thus losing the diver's knees. Moving in closer to crop the subject at the waist would have reduced the wasted area surrounding the diver. Another alternative would be to shoot the vertical subject in a vertical format. In comparison, photo **B** is well cropped with subject (diver and coral) filling most of the frame, minimizing the number of spaces which lack interest.

Photographs **C** and **D** are excellent examples of the difference in appearance that can be obtained by simply turning the camera to a vertical position. If you have a rectangular format camera, try both ways. In photo **C** the area surrounding the diver and gorgonian are mundane, while photo



D

D shifts the emphasis from the surroundings to the subject matter, creating a more interesting flow.

Composing an exciting fish photograph can be difficult, especially since the fish always seems reluctant to cooperate with the photographer. The



E



F

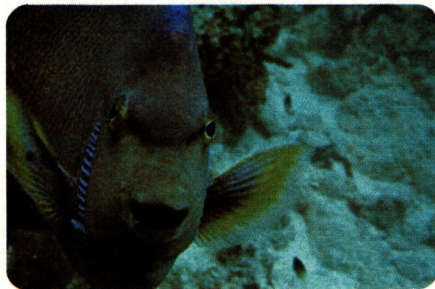
must shoot a side angle, remember the subject should always be entering the frame, not leaving as in photo E. You can rest assured that even when you are able to catch the right angle, you may still lose important parts of your subject, such as its fin (F). Finally, when you're not chasing them down, you'll be fighting them off, so preset your distance and be ready (photographs G and H).

So far the examples we've seen have been on the technical aspects of composition; angles to shoot, cropping, and vertical framing versus horizontal. Even as your knowledge of photography

angle of the fish within the image area is the most critical problem, and although there isn't a standard, better results can be achieved by stopping the movement when they face a $\frac{3}{4}$ angle towards the camera. By doing so, you can retain a certain amount of dimension and action. If you



G



H

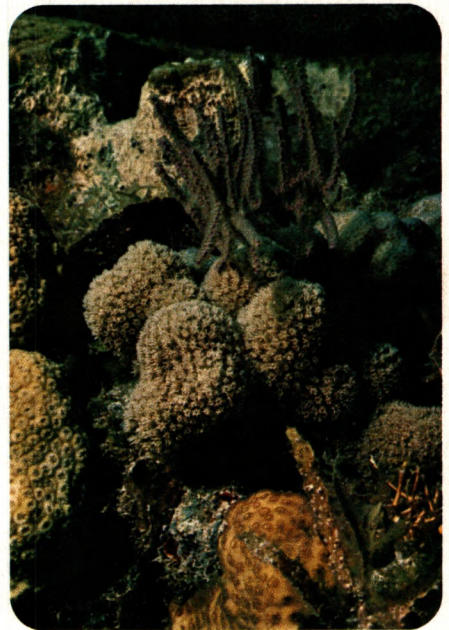
grows and you begin to master these techniques, your knowledge of creative composition will be in its infancy. For example, photo I is technically correct, the subject is entering the frame, but it lacks creative composition. Aiming the subject at a $\frac{3}{4}$ angle towards the camera would have made a major difference. Photo J is too "busy". There is no specific subject, causing the eye to repeatedly scan the entire picture. A series of such photos can be very fatiguing to the eye.

At last, when your pictures are consistently well composed, properly cropped, with definite subjects, then you have to concentrate on preventing the loss of limbs (photo K). It happens to the best, and to correct it you must watch your subject more intently and reduce the amount of random shots. Don't shoot until you're sure you've found the best angles and then wait for the right moment. By doing so, you'll catch your model with arms, legs, and fins in perfect position, and get a more satisfying photo.

Remember, all the mathematical figures and technical mechanisms are of secondary importance. Being creative is first!



I



J



K

Story and Photographs
by Jack McKenney

CALIFORNIA

SPECTACULAR AMERICAN DIVING

When most divers from inland USA think of salt-water diving, usually they fix on visions of the Bahamas, the Caribbean, or perhaps the Red Sea. That's understandable, for there is no greater fantasy than to doff one's heavy wet suit and slip practically naked into sapphire blue water of bathtub temperatures, to spend an hour or two exploring deep coral chasms, chasing brightly colored fish through shallow reefs, or to search through the remains of a crumbling old shipwreck, even if it

has been picked thoroughly clean by hundreds of previous divers.

But there is an area that perhaps will equal anything the Caribbean, the Bahamas or the Red Sea can dish up for a diet of diving that

is within easy reach and features a great variety of things to see and to do. And that is Southern California! Granted, California diving is a mite colder than Grand Cayman, but it's close and there is excellent trans-

portation to the offshore islands. And until the time comes when you swim through a giant green kelp forest that's growing from eighty feet down right up to the surface, with light shafting and

filtering down through broad leaves and stocks, and you catch a glimpse of frolicking sea lions playing tag just ahead of you...well, you're missing out on one of the really spectacular diving sites available to American divers.

Kelp is a plant that grows in many parts of the world, but nowhere is it quite so spectacular as it is off Southern California. Inside these stately forests can be found a profuse abundance of marine life from tiny colorful nudibranchs to anemones, bright orange fish,



The Garibaldi (above) is fully protected in California, the only ocean fish to enjoy such protection. Garibaldi are usually found in shallow water kelp beds or on reefs and grow to 14 inches. The small air filled sacks at the base of the kelp leaves help them float to the surface (right).



called *Garabaldi*, and yes, shipwrecks too. When you settle to the bottom on a bright sunny day in forty or fifty feet of water with kelp billowing up around you and you pause momentarily, it's almost a religious feeling: like standing in the middle of a great European cathedral with light streaming in through stained glass windows. Kelp will grow as much as two feet a day and there are kelp harvesters who, at the surface, gather this broad leafy plant to extract derivatives for use in cosmetics, ice cream and other products.

There are eight major islands off Southern California: Catalina, San Clemente, Santa Cruz, San Nicholas, San Miguel, Santa Rosa, Santa Barbara and the Anacapas. The



The purple striped jellyfish prefers the temperate waters of the eastern Pacific. Mature specimens are usually 7-8 feet in length, although some with tentacles 25 feet long have been observed.

Sport Diver



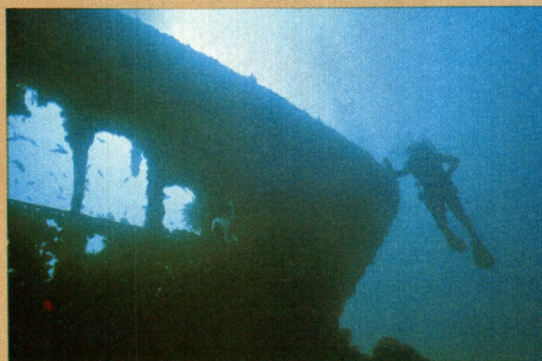
Borne to the surface by air sacks, giant stalks of kelp absorb the life-giving California sun (left).

Below are closeups of tentacles of the giant jellyfish. If touched by a diver, they can cause mild skin irritations.





The many wrecks in California waters provide the interested diver with hours of absorbing exploration. Although heavily encrusted, the machinery in the hold of the Olympic is still semi-intact, creating a mechanistic seascape of marine growth.



Billowing up around you the kelp produces an almost religious feeling: like standing in a great European cathedral with light streaming in through stained glass windows.

ones most frequently dived are Catalina and the Anacapas Islands because of their close proximity to the mainland. Occasionally, trips are operated out to Santa Barbara and San Clemente where some really spectacular diving is found. One area that is simply a couple of large rocks sticking up out of the deep is Begg Rock and is a favorite with photographers, for every square inch of the underwater terrain is literally covered with anemones, shellfish and fish. It is one of the prettiest areas in Southern California for close-up photography.

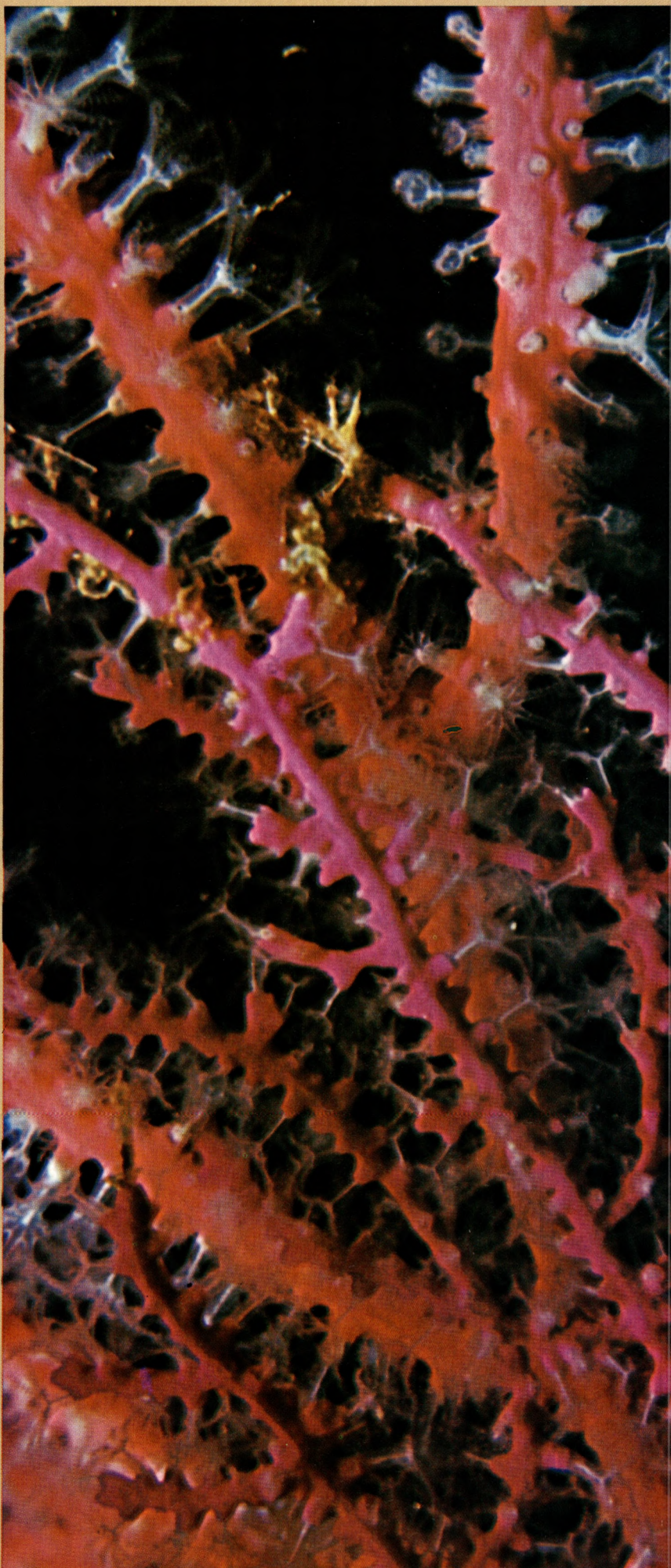
And then there are spots like Hidden Reef, alias the "Matterhorn," where Roy Hauser, skipper of the *Truth* has pioneered dives. The Matterhorn reaches to within 90 feet of the surface and is a difficult reef to find in an open stretch of ocean, but when it is found and it's a clear day it is absolutely fantastic. Here too, every square inch of this deep reef is alive with a mass confusion of *Coranactus Californica*. These strawberry anemones cover sheer walls and cliffs from the very tip to a couple of hundred feet down — the limits to which this underwater mountain has been explored.

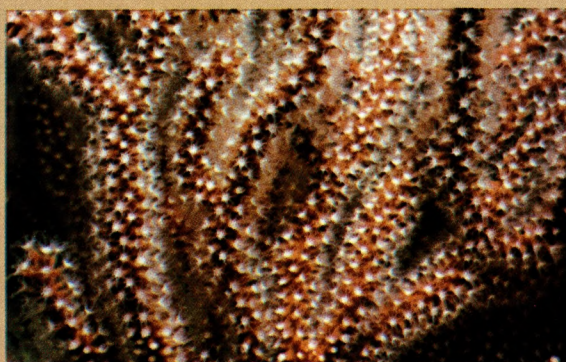
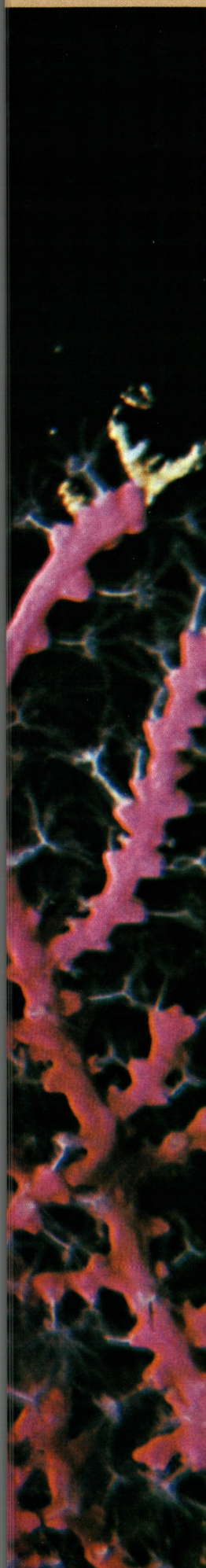
The *Olympic*, just three miles off the San Pedro breakwater appears to be right out of a Hollywood movie set. This high profile wreck profusely covered with anemones stands thirty feet high off the bottom and still has some of her machinery intact down in the holds where she sits at 90 feet. It's a favorite wreck of the California Wreck Divers as is the *Valiant*, 110 feet below the waters of Casino Point at Avalon over on Catalina Island. The *Valiant* was an elegant pleasure yacht in her day, but caught fire and sank in 1930 just a few yards from shore. It was owned

A starfish pauses, draped over a rock, its protective coloration blending perfectly with the background. At right, a macrophoto view of a gorgonian branch reveals the polyps and their whiskerlike protrusions which trap the organism's food.



Sport Diver





by Charles S. Howard who gave brass tokens to his guests that could be cashed for drinks. After 47 years divers are still bringing up these collectors coins.

One of the most spectacular and beautiful creatures I've ever photographed off Southern California is the large purple striped jellyfish known as *Pelagia Panopyra*. This lovely creature is a disc jelly found in temperate waters of the Eastern Pacific. In Southern California it can be found during the spring and summer months, often in great numbers. *Pelagia* is dependent on currents for distribution, however, it can pulsate slowly out of the way of a diver or even around kelp. *Pelagia* feeds on zoo plankton and small fish. Its sting is lethal to small fish, but unless a diver is unusually sensitive, he really

Anemones, such as these *Coranactus California* (strawberry anemones, second from top and bottom) cover the sides of "The Matterhorn", a huge rock structure that reaches up from the depths of the Pacific to within 90 feet of the surface. To the diligent diver, the wreck of the *Valiant* yields small brass tokens given by the yacht's owner to his guests.

doesn't have much to worry about from contact with the tentacles. A mild irritation will generally occur which disappears shortly. The pink ruffles will grow to be seven and eight feet long, but species trailing a long lacy gown of up to 25 feet have also been seen.

Los Angeles divers are extremely fortunate in having such a fine array of excellent dive boats to choose from for travelling to the offshore islands. There are ten boats running either out of Norm's Landing or the 22nd St. Landing down in San Pedro, that are skippered by some of the most savvy boat captains in the business. Ranging in size from 50 feet to 75 feet with diver capacities up to 45, are the *Bandido*, *Blue Sea*, *Golden Doubloon*, *Mister C*, *Rio Rita*, *Scuba Queen*, *Sea Vue*, *Toronado*, *Truth* and the *Westerly*.

If you don't have the money for flying to the Caribbean, or the Bahamas, or the Red Sea this year, jump in a van and bring the entire family to Southern California. There's plenty to do for everyone here in the Golden State. Any dive shop in the area can steer you onto a charter trip to one of the islands on certain weekdays or the weekend.



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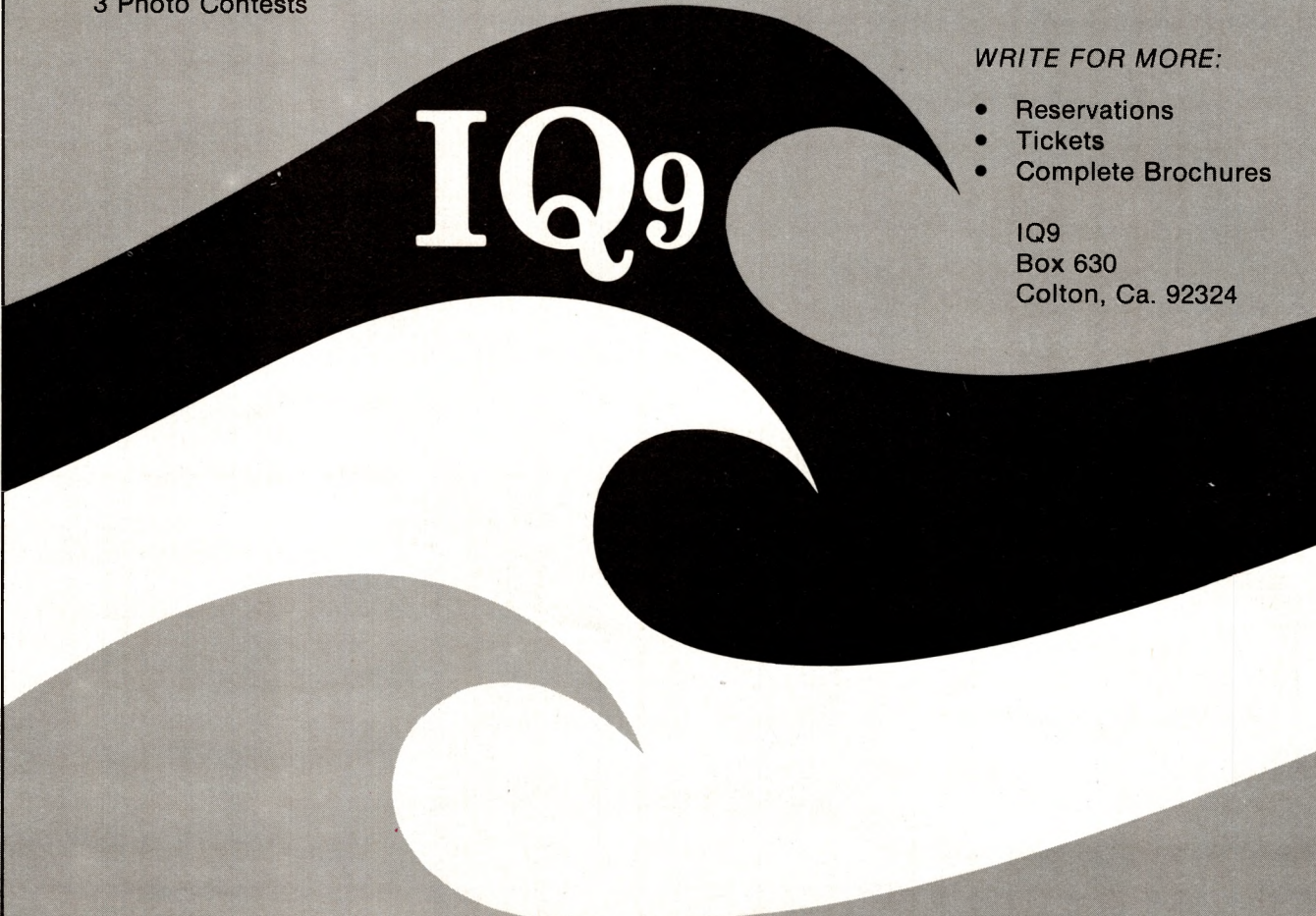
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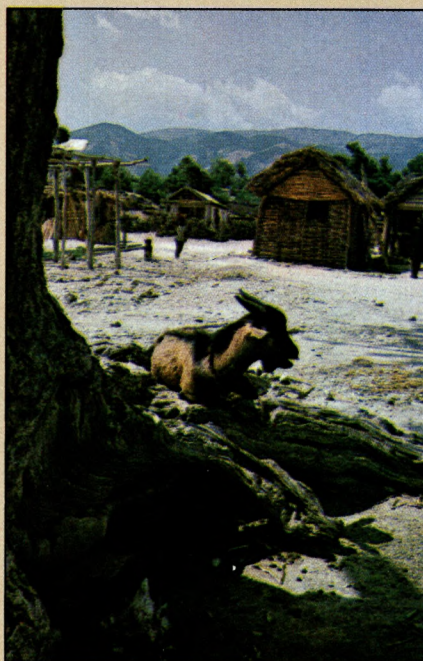
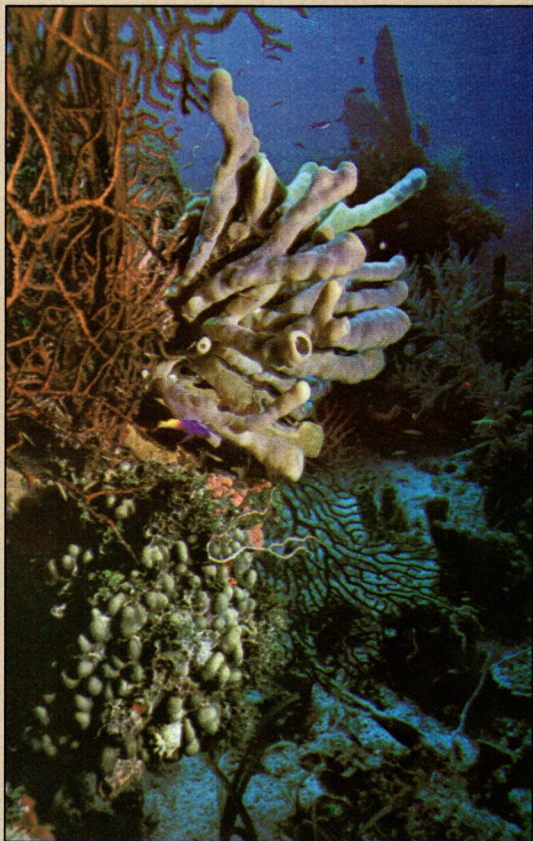
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HAITI

A full-page background photograph of a scuba diver swimming through a dense coral reef. The diver is positioned in the center-right of the frame, facing away from the viewer and slightly to the right. They are wearing a dark wetsuit, a scuba tank on their back, and fins. Bubbles are visible rising from their regulator. The water is a deep blue, and the coral structures are dark and intricate, creating a complex pattern around the diver.

Story and Photography
by Richard H. Stewart

For the people of Haiti, a country which shares its boundaries with the Dominican Republic on the island of Hispaniol, the sight of visitors who come to explore its surrounding waters is relatively new. Dive resorts were literally unheard of two years ago, and in order to dive this island, an expedition had to come overloaded with tanks, compressor, and an inflatable boat with motor. Today Haiti, which occupies 11,000 square miles of this island, has become very active in diving tourism and currently supports two resorts, extensively equipped to offer a most enjoyable experience.



Typical of the gargantuan sponges around Haiti (top left), dozens of these tube sponges can be found at all depths in the Gulf of Gonave. In the marketplace villagers barter for food and supplies (top right). At left is a memorial to the slaves who attempted to overthrow tyrannical plantation owners in the 19th century.

Tourism in Haiti has had more ups and downs than the surrounding mountains. Its history, scarred by the rule of self-interest presidents, dictators, and military juntas, has been punctuated by fluctuating amounts of civil unrest which at one time all but stopped foreign travelers from visiting the country. With the entry of Francois "Poppa Doc" Duvalier into the political scene in 1957, the country began another round of civil tension. Poppa Doc ruled in such an arbitrary fashion that those who opposed him left the country, while the United States eventually discontinued economic aid and suspended diplomatic relations. Poppa Doc's political policies and the use of several thousand armed civilian "bogeymen" to eliminate opponents and extort money caused a considerable decline in the tourist trade and contributed to the generally deteriorating economic situation.

At present, Haiti's governmental problems have stabilized and conditions are improving as Poppa Doc's successor, his son, President Jean-Claude Duvalier, continues his efforts to alter the image of Haiti. Since gaining the presidential position after his father died in 1971, young Duvalier, then only 20, has made significant improvements in the Haitian's way of life. He ended the use of bogeymen and the suppression of the people by violence. Freedom of the press has been restored and the discrimination between the blacks, coloreds, and mulattoes has been abolished. Overall, Jean-Claude has produced more effort than any past leader to improve the social and economic conditions in his country, and as a result has created a new and exciting surge of tourism.

Just what is so unique about this country? My guess is that most people who consider a trip to this land of "Vaudou (Voodoo) Spirits" are really not quite sure. With the first step off of Air France's sleek Boeing 737 there is the airy feeling you find on most islands. The warm breeze rushes across your skin, cooling the hot rays of the sun pounding from above. Immigrations pass you through quickly and customs conducts the normal brief baggage check. The instant you finish with customs you motion for the nearest of three dozen porters who are eagerly awaiting to move your bags to the taxi.

At first when you pass through the capitol city of Port-Au-Prince and

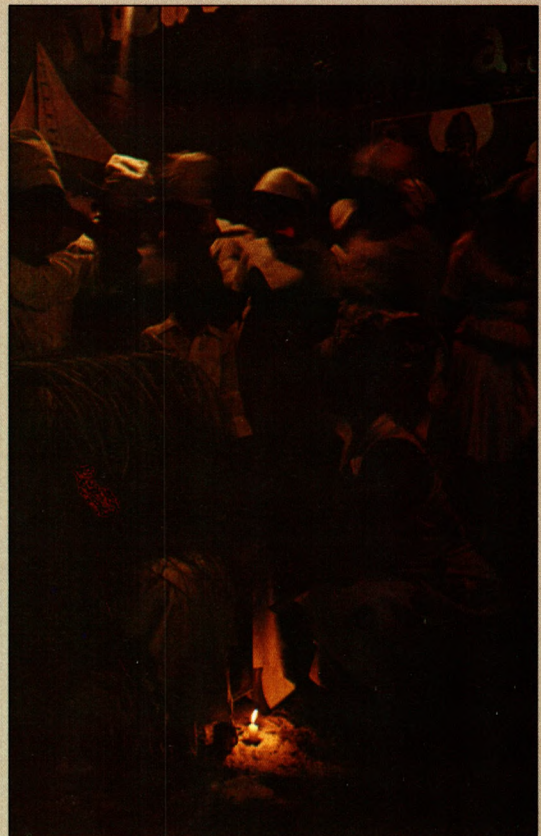
then into the outlying villages your thoughts are occupied by the shocking living conditions of these poverty-stricken people. Cluster after cluster of small huts built of clay and sticks. No electricity, no running water, no sewage system. How do they exist without what we consider bare necessities? Simple, they have never had such conveniences. The standard of living has changed little or none since their ancestors gained their independence from France in 1804. Those who are fortunate enough to have skills can work, if work is available, for the minimum wage of \$38.00 per month. Those who have no skills work for pennies.

Through the centuries of slavery and suppression, the Haitians, especially the blacks, held tight to their African inheritance, the practice of Vaudou. Just before the revolt of 1791 it is said the slaves would sneak into the hills at night, contorting themselves to strange rhythms and their gods would speak to them through their own voices. They scattered rum and flour on the ground as food for their serpent god, Damballah, carved idols out of wood or stone, and sacrificed chickens and young goats. The ceremony was a mystery they were forbidden to reveal, a sort of secret bond that linked all slaves together against the plantation owners.

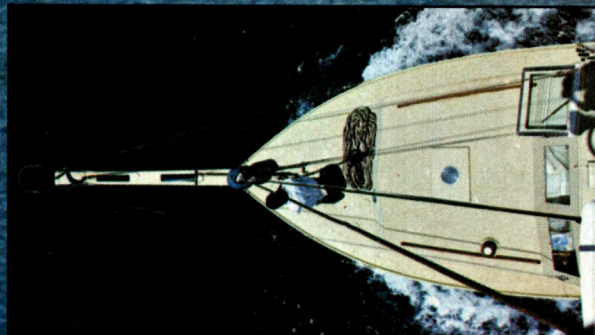
It's the people and their way of life, the mountainous terrain, and the exceptional variety of marine life in the surrounding waters that make this an unforgettable experience. Although diving in Haiti is not new, it has been somewhat unheard of due to the lack of facilities. Today diving is more common in the area of the Gulf of Gonave, where along the coast, 40 miles north of Port-Au-Prince, Oceaneer Dive Tours has established the first complete professional dive center with the cooperation of the Kyona Beach Resort.

KYONA BEACH

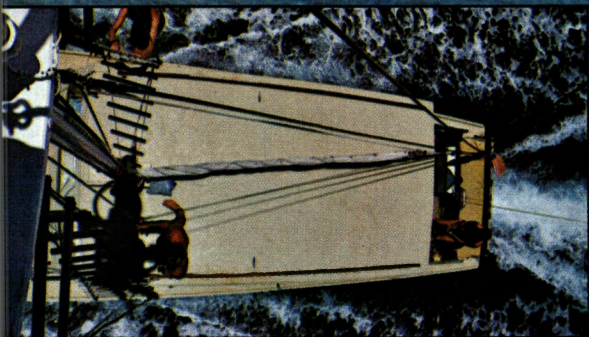
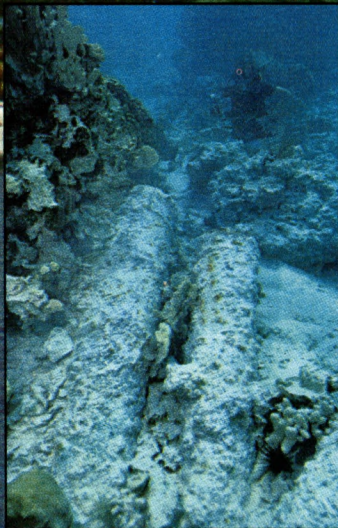
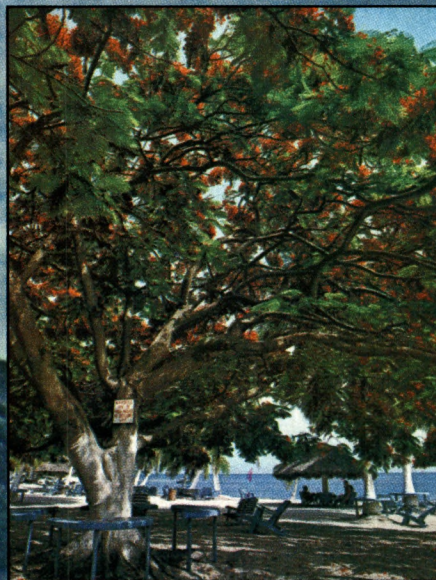
Heading up the dive facility is Phil Chalker, an ex-Great Lakes salvage diver and a stout man of the sea. Having had extensive experience (eight years) with Bahama charters, Phil came to Haiti last year with his 37 foot motor sailer "The Reef Roamer", and a determination to put Haitian diving on the map. To do so meant installing dependable compressors, such as his Joy 16 cfm and Ingersall Rand 8 cfm, and stocking the shop with close to 50 tanks. As in most cases, additional equipment is on hand if needed.



With the drums emitting a steady beat, the vaudou priest spreads flour to form the ancient spiritual designs (top left). When they are complete the participants dance over them, obliterating the drawings and the evil spirits they represent. The high priest proudly displays his son (middle left) inside one of the healing rooms where villagers suffering from evil spirits are cured. The mood of the vaudou ceremony is driven by the incessant rhythm of the drummer's primitive instrument (above). Because of the recent interest in primitive Haitian art, paintings such as "The Market Place" sell for hundreds of dollars in metropolitan art galleries, reasonably in Port-au-Prince (right).



Unusually large white sea anemones (top) are scattered throughout the reefs and wrecks. Phil Chalker feels right at home, even behind the wheel of the Lilly shipwreck (top right). A visiting diver winds his way through the small caves and tunnels that are found throughout Chalker Reef and Rich Reef (middle and right).



A flamboyant tree highlights this shaded beach area (top right). The organisms at top left are called "false coral" by the natives. The cannon wreck site (above) was named for these cannons which were found without any trace of a shipwreck nearby. Phil Chalker's motor sailer "The Reef Roamer" (left) carries divers to choice locations in the Gulf of Gonave.



Daily dives begin shortly after breakfast with the loading of gear. Phil and his Haitian assistant Lester already have the tanks loaded when you come on board, so your only thought is preparing for the dive.

Barely four miles from Kyona Beach is a small group of islands known as the Arcadines. Among these islands Phil has found several exciting spots, such as the Ramblin' Reef, a 25 foot area that gets its name from the crevices that ramble through it. Here visitors are amazed by pile after pile of sponges and the jagged array of coral and marine growth. Near the smallest of the islands is a shallow 25 foot reef called Richard's Reef, where mountain-like mounds of coral reach upwards, nearly breaking the surface and divers unexpectedly swim into velvet-like bushes of black coral. This precious coral is normally found much deeper, at 50-200 feet.

Phil's favorite reef surrounds the largest of the islands and is called, appropriately, Chalker's Reef. From the surface to its maximum depth of 40 feet, this is an incredible dive for the exploration minded. Crevices and tunnels run throughout the reef, which contains a much larger variety of corals, sea fans, and small tropical fish than most of the other areas. Definitely a dive to return to! In addition you can't miss the areas known as the Vaudou Heads or the Sponge Mound which are in the same general area of the Arcadines. Adding to the line up of dive spots is the steamship of no name. Known to have ended her days some 20 years ago while her passengers were visiting the fishing village of Lilly, today the semi-

intact ship displays its huge anchor, the pilot's wheel, and piles of valuable brass fittings.

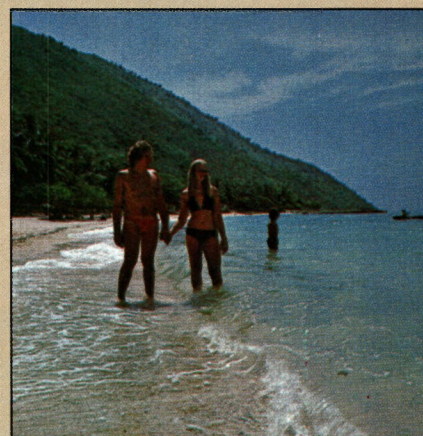
Every Monday Phil packs the Reef Roamer with grub and extra tanks to make the day-long trip to the large island of La Gonave. After the relaxing two hour trip, great for sun tans, the day begins when the anchor slips into the deep blue waters, its rope path leading to the exciting Gonave Wall at less than 100 feet. As spectacular as most wall dives are, this wall is enhanced by spots of dense black coral growth, a more abundant variety of large fish, and of course, the lure to explore just a little bit deeper! Adding to this unique trip is a visit to the small fishing village of Tetunce (Tee-tus). Here you can walk through the village, followed by the inquisitive looks of the natives, and barter for some of the most beautiful trumpet and spiny conch shells you've ever seen. The small amount of revenue the villagers receive for their wares helps support the some 500 residents that depend almost entirely on fishing and the occasional diving visitors. Before returning to Kyona there is a quick side trip to dive the cannon wreck, a

site where several cannons were found without any trace of a wreck. Still in amazing condition, the cannons could have been dumped overboard during a violent storm by a ship trying to avoid grounding on the shallow reefs.

TAINO BEACH

Thirty-five miles south of Port-Au-Prince, at the base of Geanti (zhan-tee) Mountain, is the extraordinary Taino Beach Resort. Built among jungle-like terrain, the A-frame villas blend naturally with the beach front atmosphere. Alan Baskin, a long-time professional diver and instructor, recently moved his Baskin-in-the-Sun dive facility to Taino Beach from Punta Kona in the Dominican Republic.

continued page 127



A SHORT HISTORY of EARLY DIVING EQUIPMENT



illions of years ago the ancestors of man came out of the sea, and since the beginning of recorded history man has been devising ways to re-enter the underwater domain on his own terms; to breathe freely, move about easily, and perform complex tasks.

Naked divers were recovering shells from the bottom of the Mediterranean as early as 4500 B.C. The diver was limited in that he carried with him only the air in his lungs, and although Spanish historians assert that native divers in the Caribbean often stayed submerged for 15 minutes, man still sought ways to work underwater for longer periods. The first record of man's use of artificial diving aids was by Aristotle. In 360 B.C. he described a kettle which was filled with air and let down to divers working on the bottom.

Even at this early time, divers were in great demand for military operations and underwater construction. Divers were used extensively by the naval fleets of the period. When Alexander the Great attacked the island of Tyre in 332 B.C. he found his entry to the port blocked by underwater defenses. Aristotle records that Alexander descended in a "diving machine" to watch his divers dismantle the defenses. If true, this is the first recorded use of a diving bell.

Of course Leonardo da Vinci had a design for underwater gear. In 1501 Leonardo proposed a complete diving suit of leather with an armored breast plate and a hood with glass windows. The diver wore webbed fins and gloves to facilitate swift movement underwater, and air was supplied via a snorkel pipe, the end of which floated on the surface. The Senate of Venice, for whom

the gear had been designed, rejected the plan. They sought a device which would allow their divers to approach enemy ships unseen, and they feared the snorkel would give away the diver's position. Leonardo revised his design, and so invented the first Scuba. It was similar to his first suit except the breathing tube was connected to a leather bag containing air instead of extending above the water. Leonardo refused to divulge the details of this garb to the Venetians because he feared it would be used evilly.

In the years that followed, many suits were devised, nearly all of which relied on a long snorkel tube. All of these designs are unworkable as it is impossible for a diver to draw air through a tube longer than three feet (assuming that he is as far under water as the tube allows) because of the water pressure on his lungs. The next advance was made by a Fleming, Florencio Valangren, who connected his suit's snorkel to a large bellows on the surface capable of forcing air down to the diver. In a letter to King Phillip IV of Spain in 1693, Valangren asserted that his device was in widespread use in Flanders and Holland.

In 1679 Giovanni Borelli designed a full diving suit based on the principle of air regeneration: the diver was to breathe the same air over and over, it being passed through a filter to make it fresh. The helmet was circular and about two feet in diameter with a glass window. The air inside the helmet was retained by tightening the neck of the helmet around that of the diver. The diving suit was a watertight dress of goatskin to which the helmet was laced. The air inside the headgear was inhaled through the nostrils, then exhaled through a tube held in the diver's mouth. This tube went outside the helmet to a small leather bag

by Steve Blount

Illustration by
Warren Ballard



Warren Ballard

which was intended to trap moisture from the expelled air. Borelli claimed the moisture would remove the carbon dioxide from the air, and it was returned to the helmet via a tube on the other side of the bag.

One of the first successful diving suits was devised by John Lethbridge, an Englishman. In 1715 Lethbridge built a barrel-shaped tube of metal, six feet long by two and a half feet in diameter. It was watertight, and contained air at atmospheric pressure. A glass window was provided for sight. The feature which distinguished the apparatus from the diving bells which had been in use for centuries were the arm holes in the sides of the tube. Fitted with leather sleeves which laced tightly around the diver's arms, they permitted the occupant to do many tasks with his hands. The tube was suspended so that the diver was in a prone position, and no external air was supplied. Lethbridge is reported to have gone down to 72 feet and remained there for 34 minutes using his invention.

A German named Klingert produced a sort of wearable diving chamber in 1797. A domed helmet came down to the shoulders where it connected with a leather midsection; this in turn was connected to a rigid waist portion to which was attached a pair of leather breeches terminating just below the knees. Like Valangren's suit of the previous century, air was forced down to the diver by means of a bellows on the surface. The suit was tried in the Oder River, but met with limited commercial success, perhaps because of its cumbersome appearance. In his account, Sir Robert Davis was prompted to note that "...the diver bore a striking resemblance to Lewis Carroll's Tweedledee and Tweedledum."

Another German made the next important advance in diving technology. In 1808 Friedrich von

Drieberg invented an apparatus he called the *Triton*, which was a cross between a Scuba and a surface-supplied suit. Tubes from a surface pump connected to a metal cylinder filled with air on the diver's back. A breathing tube led to the diver's mouthpiece. Most of the time the surface pump supplied the diver's air.

However, in case of an emergency the surface tubes could be disconnected and the air reservoir used alone.

That same year, Brize-Fradin patented a design which featured a full diving suit and helmet. The diver carried a tank of air on his back and a hose led from the reservoir to the helmet.

Whether the suit functioned is not known.

The first workable diving dress designed to function completely self-contained was patented by an Englishman, William James, in 1825. Similar to the *Triton* in concept, the diver wore a cylindrical iron belt which covered him from the waist to the armpits. This reservoir contained compressed air at 30 atmospheres and connected to a helmet via a breathing tube. A full suit with weights and heavy boots completed the attire.

The first modern diving helmet was the brainchild of Augustus Siebe. In 1819 Siebe unveiled a brass helmet into which air was pumped from the surface, and a canvas and leather suit. The excess air was let out by vents at the waist.

Unfortunately the vents were always open, so the diver

couldn't bend over without allowing all the air in his suit to escape. In 1834 an American named Norcross eliminated this problem by relocating the exhaust vent of his Siebe suit to the top of the helmet.

In 1837 Siebe adopted Norcross' vent and added a valve allowing the diver to cut off the exhaust at will. This let the diver build up pressure in the suit, allowing him to reach greater depths. Also, if his communications



The diving bell (a) was used from very early times until the 18th century. Borelli's rebreather (b) failed, but Lethbridge's metal suit design (c) has evolved into the deep sea chambers of today. Klingert's outfit (d) was ungainly but effective. The Brize-Fradin suit was a novel design but we don't know if it worked. The Siebe helmet (f) was the forerunner of modern helmet rigs.

with the surface were cut off, he could inflate the suit like a balloon and float to the surface unassisted.

Until this time, full suits and Scuba apparatus had appeared both separately and in combination as components of different gear. Around the beginning of the 19th century however, the two types of gear began to be differentiated as inventors produced designs which would be geared to heavy labor and deep dives (helmet types) or to greater mobility (Scuba).

Another *Triton*-type device appeared in 1865. Two Frenchmen, Benoit Roquayrol and Auguste Denayrouze, produced a device consisting of a metal cylinder containing air at 40 atmospheres pressure and connected to a surface-supply hose. Like the *Triton*, the surface-supply hose could be disconnected for free movement. The important aspect of this development however was the attachment to the air reservoir of a device which regulated the amount of air going to the diver. This regulator had a membrane which was exposed to the outside water pressure and which allowed air at pressure exactly equal to the water pressure to enter the diving suit. The regulator also sent air to the diver's mouthpiece only when he took a breath, thus conserving precious air. The net effect of these two actions was that the surface pumps, which in those days had a limited capacity, did not have to work as hard to supply the Roquayrol-Denayrouze equipped diver as they would to supply the diver with the standard helmet gear. Therefore, the Roquayrol-Denayrouze device could be used at greater depths than the standard helmet rigs of the period. This invention was so satisfactory that it was manufactured commercially beginning in 1867, and soon had been adopted by most of the navies of the world. Soon afterward, Jules Verne immortalized the Roquayrol-

Denayrouze gear in *Twenty Thousand Leagues Under the Sea*.

A modern descendant of Borelli's rebreather apparatus was introduced in 1876 by an English seaman, Henry Fleuss. The components were an air hose and a filter system. The reservoir contained pure oxygen which was breathed and then passed through caustic soda, which removed the carbon dioxide. The diver could

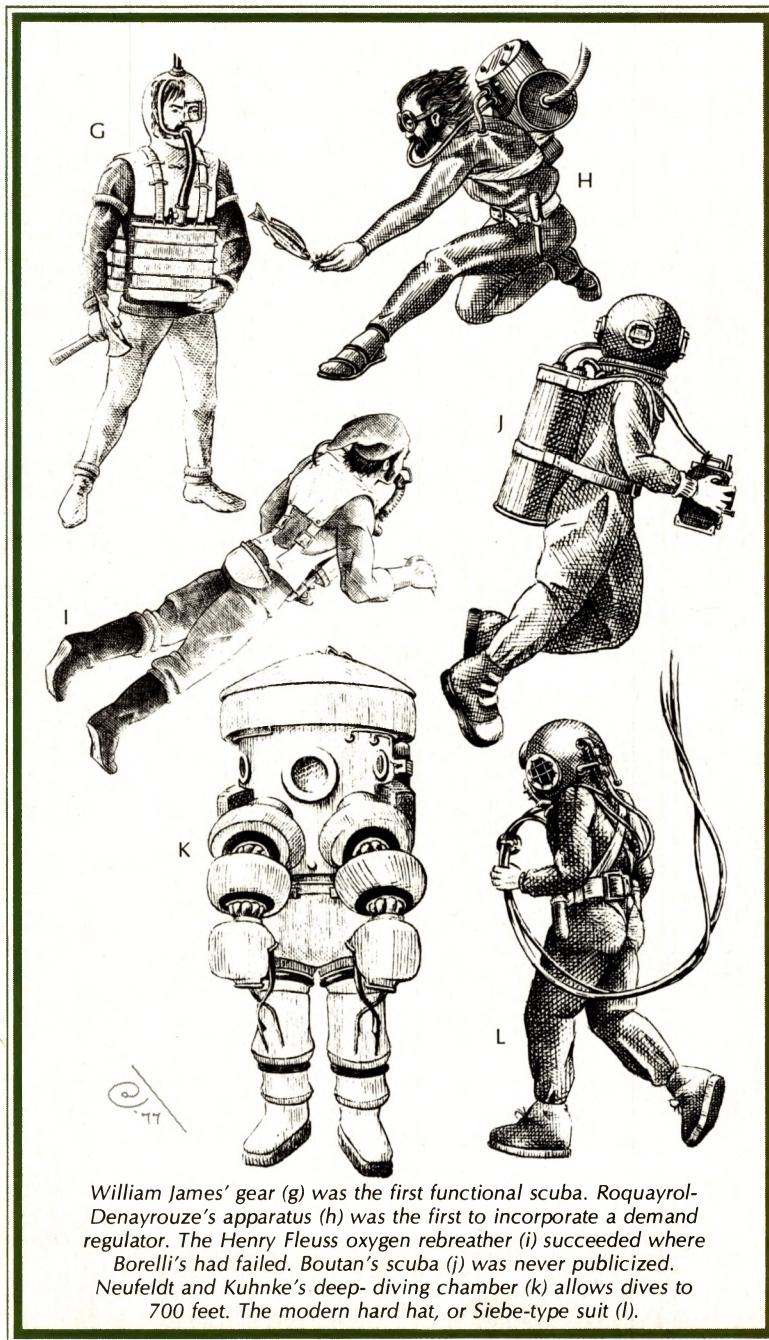
rebreath the same oxygen for three hours. Although the diver was freed from connections with the surface, pure oxygen is poisonous below 33 feet, or when the diver exerts great physical effort. The Fleuss system was used extensively for work that required complete mobility underwater, and as an escape device for submarine crews. Also, as the Fleuss device left no tell-tale stream of bubbles, it was considered the only safe way to carry out underwater sabotage during World Wars I and II.

During these years inventors were upgrading the helmet suits then in use, and also experimenting with armored diving apparatus similar to Lethbridge's 1715 suit. Various designs were tried, culminating in the development of an articulated diving shell by the German firm of Neufeldt & Kuhnke in 1913. The shell was a metal body shaped like an oversized human. The arms and legs had flexible joints, the arms terminating in pincers which could be worked by the diver inside. Tanks attached to the back of the suit

supplied oxygen at nearly atmospheric pressure, and filters were provided for regeneration of the air supply.

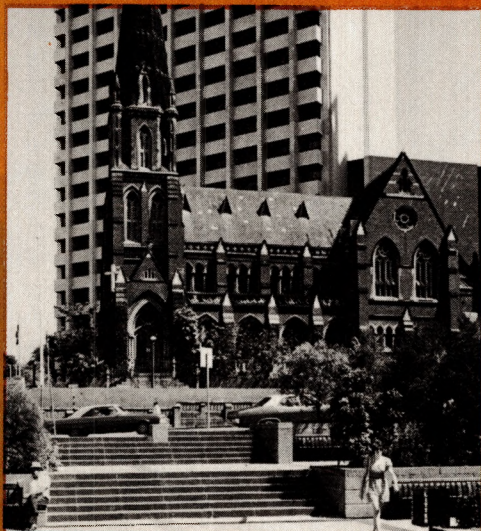
Using this gear a diver could descend to 700 feet and perform all sorts of complex tasks. This was the same type of gear used in the recovery of gold from the wreck of the liner *Egypt*.

Around the turn of the century, a French *continued page 100*



William James' gear (g) was the first functional scuba. Roquayrol-Denayrouze's apparatus (h) was the first to incorporate a demand regulator. The Henry Fleuss oxygen rebreather (i) succeeded where Borelli's had failed. Boutan's scuba (j) was never publicized. Neufeldt and Kuhnke's deep-diving chamber (k) allows dives to 700 feet. The modern hard hat, or Siebe-type suit (l).

The Fifth World Underwater Conference



In Brisbane, capitol of Queensland, the contemporary architecture of the State Government Insurance Office Building contrasts with the Methodist Church near King George Square. Brisbane, 630 miles north of Sydney, is Australia's third largest city.



At left is Herron Island, a true coral cay that will support the scientific workshops concentrating on the ecology and maritime archaeology of the Great Barrier Reef. (Right) Fairy penguins are a popular attraction on Phillip Island. At dusk they come ashore to make their way to burrows in the surrounding sandhills.

The Fifth World Underwater Conference, Downunder '77, is being held in Brisbane, Australia September 10th through September 25th under the sponsorship of the CMAS-World Underwater Federation.

This marks the first time the yearly CMAS conference has been held outside Europe; previous conventions were held in Barcelona, London, and Stockholm.

Downunder has caught the imagination of the diving world, and this is particularly reflected in the enthusiasm shown by the scientific community. The convention is an opportunity for members of the diverse underwater disciplines to get together and learn from each other. Concurrent conferences, such as those on sport diving medicine, maritime archaeology, and artificial reefs are being held. Selected scientists participating in these specialized symposiums will present papers on new research in their fields.

In addition to the scientific symposiums, a General Symposium will be held for the attending sport divers and aquatic enthusiasts. During the first four days of Downunder an International Trade Exhibition will be held in Brisbane City Hall and the adjoining King George Square. The CMAS promises it will be the largest exhibition of diving equipment, underwater vehicles, technological



DOWNUNDER SEVENTY-SEVEN



accessories, and electronics ever assembled in the Southern Hemisphere. It is expected that 20,000 people will view the exhibition in addition to the 3000 Downunder participants.

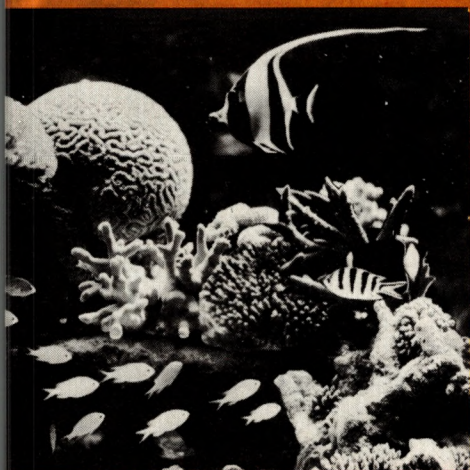
As at all Downunder conventions, there will be an international photo competition. Photographers from around the world have each submitted six color photographs in the categories of Nature and Man in the Sea. An extensive selection of the latest underwater films will be shown also.

When the convention programs in Brisbane have concluded, the participants will travel either to Herron Island or the Great Keppel Group for diving on Australia's Great Barrier Reef. Local divers will act as guides and instructors will be on hand to lead mini-courses in photography, advanced dive techniques, and the like. The scientists attending Downunder will continue their workshops at the two dive sites, concentrating on the ecology of the Great Barrier reef and maritime archaeology.

Some of the other dive areas to be visited by the conventioners include Jervis Bay, Coffs Harbour, and Mount Gambier.

Watch the third issue of Sport Diver for a recap of the exciting happenings at Downunder '77.

The Lion fish shown at right is but one of the many tropical fish which inhabit Australia's Great Barrier Reef. Below right, kangaroos, the largest and best known marsupials, are seen in fauna parks near most of the capitol cities. Australia's most famous animal is the cuddly Koala bear. Koalas are found principally on the east coast from northern Queensland to Southwest Victoria. The name Koala comes from an aboriginal dialect meaning "no drink".



SEACOLOGY

BLACK CORAL

BEAUTY FROM THE DEEP



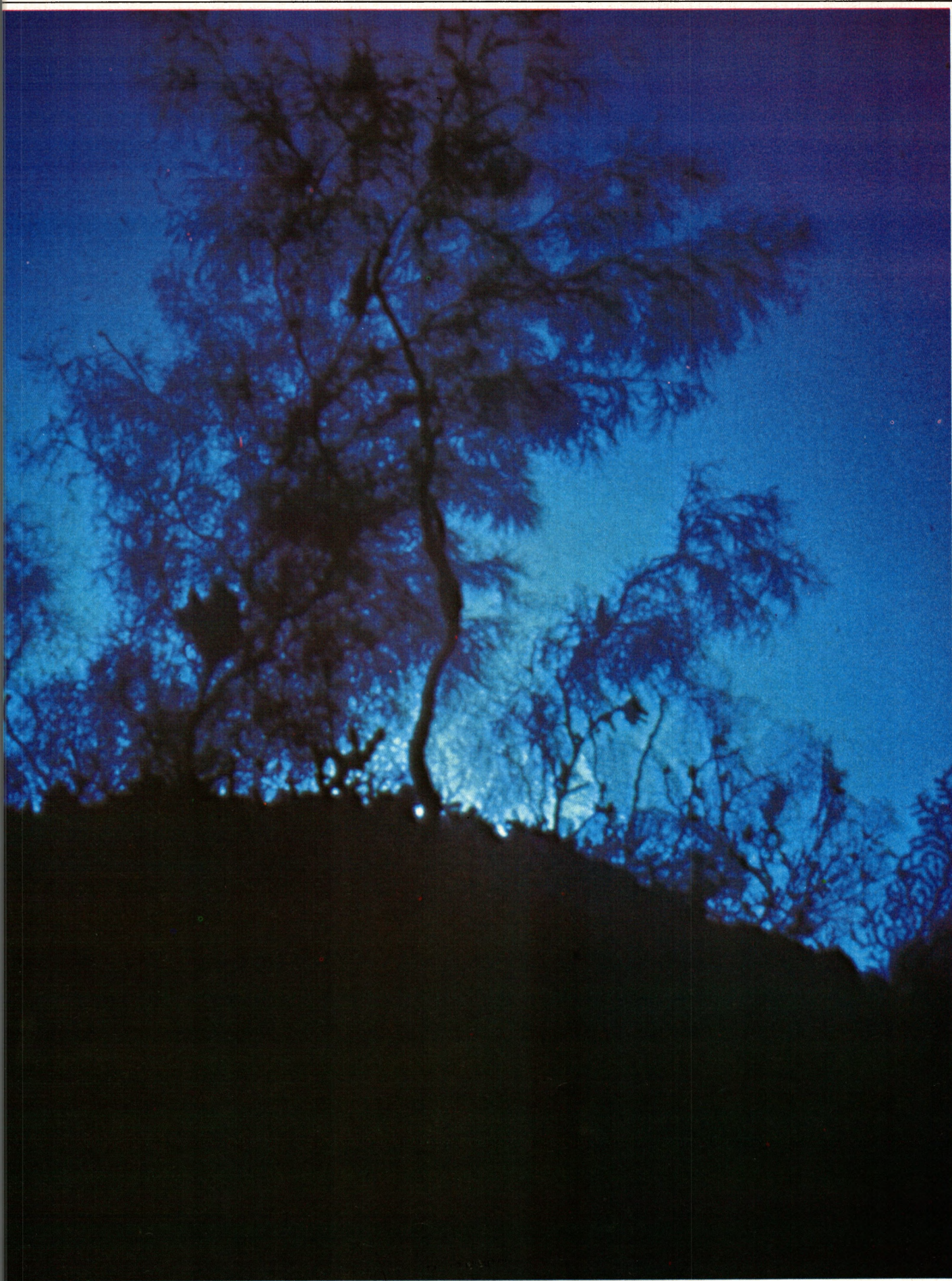
Courtesy Maui Divers

It was once very fashionable to furnish one's home with the skeletons and carcasses of animals taken from the sea on diving trips. Today, however, a significant danger exists, those animals and plants which are most desirable are facing serious depletion and even extinction. It's up to all of us to observe good conservation practices, and to help preserve the beauty of our world underwater.

Editor

BY ELLSWORTH BOYD





Rick Grigg



Preceding page:
(Left) A black coral pendant by Maui Divers. (Right) Black coral "trees" cover a small ridge at 200 feet. Above: A diver carries a large coral tree towards the surface. At left, Juan Garcia polishes black coral in the market at Cozumel, Mexico. Marine biologist Ken Bailey examines a large black coral tree brought up from a Bahamian reef (Right).

Ellsworth Boyd

The sun was nowhere in sight, and the sky, above a high scattering of cloud-mist, was the palest of late-afternoon blues. I glanced over the side of the boat but the flat surface was an opaque mirroring of the pale sky and I saw the same thing below me as above.

"Don't worry, it's down there" Ken Bailey assured me. Tightening his b.c. vest, he drew a quick test-breath from his regulator. "And if you're ready, I'll take you down and show it to you."

I nodded and Ken's 250-pound frame shattered the reflected sky, the ripples closing swiftly over him, his body a shadow disappearing down the anchor line. Like a kid playing follow-the-leader, I plunged after him, hellbent to see in real life what I had been studying in books for over a year.

Bahamian waters are noted for their clarity and sure enough, 25 feet below the surface we spotted the reef. Unlike the prolific shallow water reefs, it was a barren plain, sparsely covered with scattered patches of gorgonians and a few small coral heads.

Rick Grigg



Ellsworth Boyd

BLACK CORAL



Ken waited at the anchor, then motioned to his left. Through the deep blue haze, 50 feet away, I saw the barren plain gently tumbling downhill, a small portion of the famous Andros "wall", the third largest barrier reef in the world.

A short distance down the slope, at a depth of 190 feet, Ken stopped and pointed. There, in the indicated direction, I saw the object of my search and research: a four-foot tall, feathery black coral "tree". Gingerly extending my arm, palm down, I reached out and I petted it! I petted and caressed the undulating phylum like it was a long-lost puppy!

Sensing that I was marked, Ken signaled to leave, and reluctantly, I agreed. During the gradual ascent I glanced back for one last, fleeting peek at my new-found love. This was the beginning of a love affair with a treasure from the sea that has endured nearly four years.

I thought I knew a lot about black coral until recently, when I talked with Dr. Richard W. Grigg of the Hawaii Institute of Marine Biology, University of Hawaii. Dr. Grigg has made about 800 precious coral dives all over the world. His scientific research and evaluations are numerous, including: "A Contribution to the Biology and Ecology of the Black Coral *Antipathes Grandis* in Hawaii"; "Status of the Precious Coral Industry in Japan, Taiwan and Okinawa"; "The Commercial Potential of Precious Corals in the Western Caroline Islands, Micronesia"; "Economics and Market Potential of the Precious Coral Industry in Hawaii"; and "A New System for the Commercial Harvest of Precious Coral".

Although Dr. Grigg has studied and dived for red, pink, gold, and bamboo

coral, his initial endeavors in the early 60's focused on the biology of the black coral industry. In 1970 a grant was awarded to the University of Hawaii by the U.S. National Sea Grant Program, to fund an investigation of the ecology of precious corals in Hawaii. Further studies took Dr. Grigg to the Western Caroline Islands, Micronesia, Japan, Taiwan and Okinawa. Hawaiian waters command most of his diving time and research now as he continues his investigations into the ecology and fishery potential of the precious corals.

"The Sea Grant Program has been instrumental in helping to establish guidelines for the industry," Grigg said. "Although the precious coral fishery dates back to antiquity, there's been little attempt in the past to manage exploitation of it. A repeated pattern of the fishery in different parts of the world has been exploration, discovery, exploitation and depletion. The continued growth of the precious coral industry in Hawaii, as well as U.S. regulations mandating management of the resource by the U.S. Fisheries, were contributing factors which led to the development of a plan for resource management.

"Regulatory measures are important for future growth and development. The future of the precious coral industry will largely depend on the discoveries of more coral beds and the continued development of efficient methods of collection and management."

In Hawaii, commercial beds of black coral were discovered in 1958 and have since been exploited by scuba divers at depths between 150 and 250 feet.

"There are regulations now which restrict the number of coral divers,"

BLACK CORAL

Grigg explained, "but the job, because of its dangerous nature, hasn't been a competitive one. There are about a dozen commercial black coral divers in Hawaii who dive on a regular basis. Several dozen more sport divers or collectors dive occasionally, but they only take an incidental quantity."

"Surprisingly," Dr. Grigg continued, "the black corals are found in all oceans of the world, and of the 150 species, only four have been commercially exploited for jewelry manufacture. In Hawaii, large beds of *Antipathes grandis* exist off Lahaina, Maui and the southern coast of Kauai. Smaller beds have been reported off Sandy Beach, Oahu, and South Point and Mahukona on the big island of Hawaii, while scattered colonies are found off almost all Hawaiian coasts at depths below 100 feet."

"Black coral polyps secrete a skeletal substance analogous in function to bones in human beings," Dr. Grigg explained. "The skeleton consists of proteins and provides the structural support for the polyps which are rust-colored in life."

"The skeleton of black coral isn't actually black; it only appears so because it is opaque to light. When thinly cut or powdered the true rust-brown color is apparent. Although some divers refer to black coral as 'trees' they are really colonies formed by hundreds or thousands of tiny animals which secrete the proteinaceous skeleton."

The rough texture of the surface is due to microscopic spines in the skeleton. This characteristic distinguishes black corals from gorgonian corals which lack the spines. When cut in cross section, rings are found in many species similar in trees. Dr. Grigg recently discovered that, at least in one species, the rings are laid down annually.

During my interview with Dr. Grigg he cleared up a misconception of mine — that the deeper black coral is found, the better its quality. "Not necessarily," he said. "In Hawaii, colonies of the best quality are found from 50 to 300 feet. Both at shallower and deeper depths specimens of lower quality are found. In very shallow water enrustations are common and the skeleton is not of even consistency. In deeper waters species tend to be smaller and more brittle."

Although black corals are found in tropical seas the world over, the biggest and the best quality come from Hawaii. Dr. Grigg explained that black coral grows best in areas of subdued

sunlight and turbulence-free waters. "That's why," he said, "it's often found on deep slopes, drop-offs, and sometimes in caves."

Hawaii is one of the few places in the world where black coral is commercially gathered and exported. Exquisite black coral jewelry appears in many of the showcases and windows of shops on the islands. First discovered off the coast of Maui, near the old whaling village of Lahaina, it is plucked from the deep waters of the Auau Channel. The treacherous tide currents combined with the great depth make black coral diving a dangerous occupation. Few divers continue for more than 10 years because of bends and other related accidents.

Maui Divers of Hawaii Ltd. is the largest coral jewelry manufacturer in the world, designing and producing black coral creations for sale through a chain of specialized shops. The raw materials, twigs, branches, stems, and whole trees, are sorted in the receiving room of the main warehouse. Each piece of gem quality coral is weighed and selected according to size and quality. Then the cutting and shaping is done in a pattern to bring out the very best in each piece. Special designers shape each piece on an individual basis.

Particular attention is paid to irregular "driftwood-shaped" pieces of coral. These are polished in their natural shape and fitted to mountings designed especially for their unusual contours and become highly prized clasps, pendants and dinner rings.

Hawaiian waters, however, do not hold exclusive rights to this fascinating deep sea product. Joe Dorsey discovered black coral growing in the deep waters off Grand Bahama Island and Nassau, but it was off Cozumel and Grand Cayman that he found it most profuse.

"In Cozumel," Joe disclosed, "about one mile from shore, in 160 feet of water, black corals were scattered like trees in a pine forest, literally hundreds of them. They started along the famous Cozumel drop-off — the sloping wall of Palancar — and went from 100 down to 125 feet. These were small trees, about a foot tall, but at 160 to 200 feet the biggies appeared. A few were five feet high, with majestic, spreading limbs. Some of them reminded me of fir trees, sort of pyramidal, no two exactly alike. But I also swam over areas where just the stumps of trees remained. They had been harvested with no selectivity

or conservation practices in mind. That entire reef patch was barren."

Cozumel has a fascinating black coral market right on the waterfront. Hand carved wares are on display in over a dozen stalls, each with its craftsman working diligently on unusual creations. When I was in the summer of 1975, I interviewed a retired black coral diver, Pablo Toscano, a ten year veteran of this respectable, but dangerous, business.

"We lost, on an average, one diver a year," Pablo said. "Most of the black coral has been taken from the shallower reefs and the young divers, they defy the diving physics, are going too deep. They work in pairs. One spots it, the other one gets it. They go over 250 feet, stay too long, get narked and never return. One, who died last week, ran out of air coming up. He never made it to the surface. They're foolhardy divers."

In Mexico and other Caribbean areas black coral diving is forbidden by law. However, because of its commercial value many countries do not enforce the laws. In Hawaii, the diving is now managed by the State Fish and Game Commission, and it's illegal to gather corals less than four feet in height.

Black coral is plain and unattractive in its rough, dried state, but with sandpaper, jeweler's rouge and a buffing machine, it can be transformed into a shapely, delicate gem. It can be worked three or four days after harvesting, but it's preferable to wait about six weeks to minimize cracking. It has a hardness of about 2.75 on the Mohs scale, compared to a diamond which is 10.

The finished products are absolutely fascinating. Finely carved, exquisite and unusual, it's a gem of beauty and individuality. Usually, the hand-polished pieces aren't as glossy as those buffed on machines, which are matchless. There are some imitations on the market, so be careful if you make a purchase. Readers may write to me: Rt. 2, Box 408, White Hall, Md. 21161, for details on how to finish black coral and where to purchase legally harvested pieces at a reasonable price.

Just as the finished products draw a variety of prices, so does the raw material. Prices vary on different islands and in various parts of the world, and like many products in today's society, the price is often what the consumer will pay. Quality of course is important; some trees are

continued page 119



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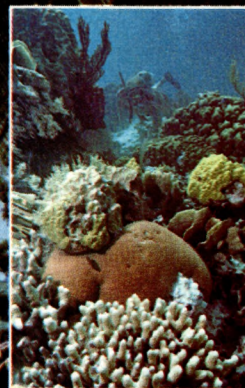
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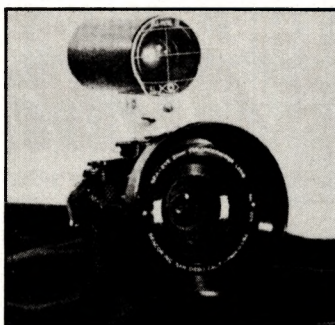
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IN THE NEWS

U. N. Treaty Draft Released

The three and a half year old United Nations conference on the Law of the Seas has released a document which will be used as the basis of negotiation for a broad treaty regulating use of the oceans.

The document contains provisions which divide the oceans into territorial waters, a universal economic zone, and the high seas; regulate fishing in all ocean waters and the mining of sea bed minerals, and guard against pollution.

There is general agreement that territorial waters should be extended from the traditional three miles to 12 miles, and that every coastal state is entitled to an economic zone reaching out 200 miles. Forty-three countries have already established 200 mile limits as fishing zones, economic zones, or territorial waters. The U.S. imposed a 200 mile fishing zone March 1, 1977.

The U.S. and other advanced countries are still locked in dispute with developing countries over who should control and mine manganese, copper, nickel, and cobalt nodules from the ocean floor.

The United States has proposed a system under which private corporations and countries would exploit the minerals on even terms with an International Seabed Authority. The proposed authority would mine through an operational arm called the Enterprise.

The Third World countries, who look to the Authority for money to finance their development have tendered a compromise under which mining by entities other than the Enterprise would be permitted on the basis of contracts with the Authority.

The Third World countries are also insisting on two provisions the advanced countries won't accept: a sharp limitation of seabed mineral production to curb competition with land based output, and a 20 year cutoff of corporate mining.

Consortiums of companies in the U.S., Canada, Britain, France, Belgium, the Netherlands, West Germany, and Japan want to start deep sea mining in 1982.

The first mine site will cost the Authority an estimated \$500 million, with financing expected to come from bank loans guaranteed by participants in the I.S.A. at percentages equal to their share of the U.N. budget. The U.S. contributes one fourth of the U.N. budget, and would have to underwrite loans to the I.S.A. in the amount of \$125 million.

The 1600 conferees from 145 countries will reconvene in Geneva, Switzerland on March 28, 1978 to attempt to work out the disputed provisions in the first draft.

Cold Water Prolongs Survival of Drowning Victims

Researchers at the University of Michigan have discovered the existence of a

reflex in human beings which postpones death in victims who have drowned in cold water.

According to Dr. Martin J. Nemiroff "This reflex slows down the heart and redistributes the blood flow so that there's a feeble, but constant supply of blood to the brain. This extends possible survival in very cold water perhaps up to one hour."

In 13 cases which Dr. Nemiroff studied, the victims were drowned in cold water (under 70°F) for between four and 38 minutes, yet were revived because they received immediate resuscitation. Of the 13, nine recovered with no brain damage, two suffered brain damage, and two died of lung infections. Until now it was thought that brain damage always occurred when oxygen was cut off for more than four minutes.

In one of the cases, a college student was submerged in his car in a frozen pond for 38 minutes. When he was pulled to the surface he was declared dead. The body gave an involuntary gasp, and the rescuers applied resuscitation. After 15 hours the student regained consciousness and full mental powers.

Dr. Nemiroff stresses that it is most important that revival efforts begin as soon as the victim is removed from the cold water. Apply external heart massage and ventilate with the purest oxygen available which has been warmed to 110°F by a humidifier.

"Sea Monster" Netted, Identified

A huge creature whose decomposed body was netted by a Japanese trawler off New Zealand has been identified as a plesiosaurus by Japanese scientist Tokio Shikama. Shikama, a professor at Yokohama International University and an authority on extinct animals said that the plesiosaurus is generally thought to have been extinct for more than 100 million years.

Crewmen of a trawler owned by Taiyo Fishery Company reported that they snagged the body of the creature in their nets in April, about 980 feet deep off the coast of Christchurch, New Zealand. The two ton carcass was pulled onto the ship's deck by a crane. It had a five foot long neck, a seven foot tail, and a body about 32 feet in length. After taking four color photographs and a piece of tissue, the trawler crew dumped the body back into the ocean.

Shikama made his identification from the photographs. If authenticated, this marks the first time that a plesiosaurus has been seen and photographed at such close range. Plesiosaurs are thought to make up the bulk of the strange aquatic creatures which have been reported in Loch Ness, northern Canada, and the open sea.

Seaborne Ventures Salvages Mercury

Seaborne Ventures, a Miami-based treasure salvage company, is attempting to recover the cargos of two Spanish mercury

carriers which sank off the Dominican Republic in 1724. Mercury was used in the silver refining process, and ships laden with it were sent to the New World from Spain, returning filled with silver.

The mercury has been slowly seeping from the wrecks over the years and has polluted the bay in which they lie. Dennis Standerfer and Steve Voynick, owners of Seaborne Ventures, have signed a contract with the government of the Dominican Republic allowing them to keep half of whatever they find on the mercury carriers and other Spanish colonial period wrecks which they have located in the area.

This contract with Seaborne marks the first time that the area off the Dominican Republic has been opened to a major salvage effort.

Canyon in the Atlantic

A huge canyon has been discovered on the floor of the south Atlantic by a team of scientists from the U.S. National Science Foundation.

Located 1300 miles southwest of Cape Town, South Africa, the canyon is 700 miles long, 18 miles wide and two to two and a half miles deep. It is part of a series of major fractures in the earth's crust.

The scientists say the canyon is supportive evidence for the tectonic plate theory which holds that the earth's crust is made of large interlocking slabs which are constantly moving.

Underwater Archaeologist Finds Brain

A 6,000 year old human brain has been found near Sarasota, Florida by an underwater archaeologist. The brain may contain the oldest preserved brain matter yet found.

Dr. Carl Clausen, who is directing work at the site under the sponsorship of the National Geographic Society, says up to 2,000 people who lived 7,000 years ago may be buried in the area around Little Salt Springs where the brain was found.

The site has also produced an extinct tortoise skewered by a stake, and a 10,000 year old boomerang. The three-foot-long stake indicated it probably was shaped and pointed by a prehistoric hunter, making it one of the earliest wooden weapons yet found in the New World according to Dr. Clausen.

Carbon tests indicated that the spear and tortoise shell are from 12,000 to 13,000 radio-carbon years before present.

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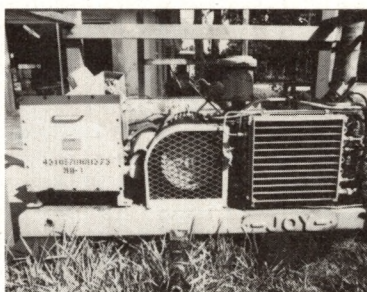
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A SHORT HISTORY of EARLY DIVING EQUIPMENT

continued from page 89

professor of biology at the University of Algiers, Louis Boutan, began to dive and experiment with underwater photography. He found that none of the diving gear then available met his need for unrestricted movement. Boutan wore a full helmeted suit with a large metal cylinder of compressed air on his back. The air was sufficient to sustain him for three hours at a depth of 70 feet. Although he never publicized his apparatus, Boutan's suit was a fully functional modern scuba.

In 1933 Yves le Prieur, a French naval officer, began manufacturing a commercial scuba device. A steel cylinder on the diver's back supplied a constant flow of compressed air into a full face mask. There was a valve which the diver could use to increase or decrease the air flow, although there was no regulator.

The regulator which had proved so successful on the Roquayrol-Denayrouze gear was ignored by later inventors until, in 1942, Emile Gagnan and Captain Jacques-Yves Cousteau combined the steel cylinder of Le Prieur with the regulator and thus created the aqualung that we know today.

The aqualung, and its deep-diving counterpart the bathyscape, have carried men into the very deepest regions of the sea, to places inaccessible to all but divers of the current generation. Using these devices the diver is almost as free as any other subsea creature, limited only by his imagination and his endurance.

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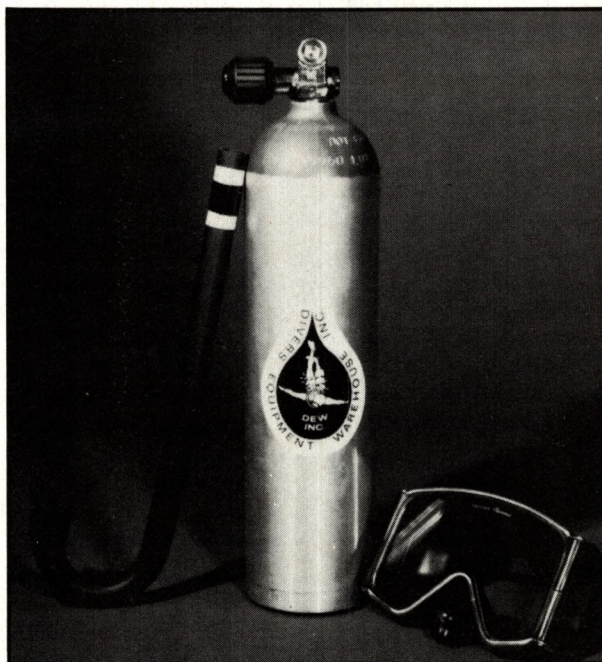
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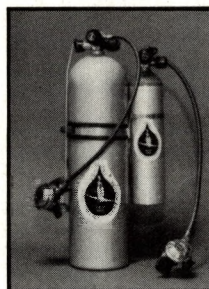
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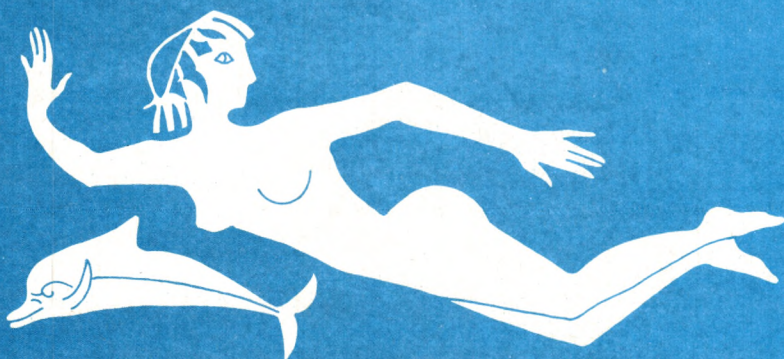
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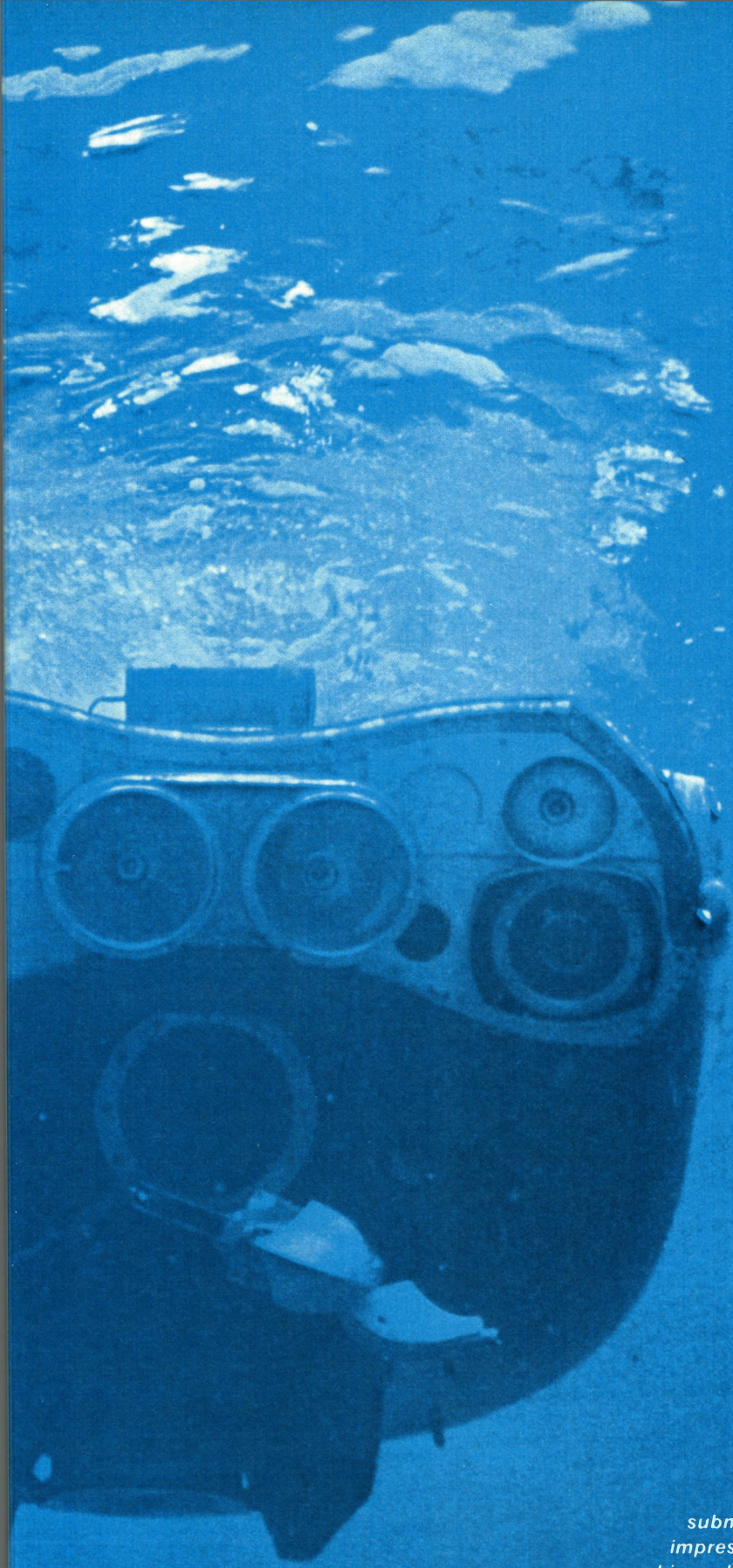
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COUSTEAU MYSTIQUE

*Photography and article
by Rick Freshee*





The scene is a large auditorium on the outskirts of Winter Haven, Florida. A crowd of thousands has gathered to see and hear two modern day folk heroes. It's an "Involvement Day" presentation, the first in a series of environmental get togethers sponsored by the Cousteau Society. After a tense period of waiting, Captain Cousteau and Phillipe Cousteau are introduced and step to the stage. There is a thunder of applause, people rise to their feet, and even before a word is spoken there is electricity in the air.

This "electricity" is the vital force of the Cousteau mystique. It happens in book and film, on TV, and in person. Cousteau's environmental concerns and philosophical interpretations are of some of the most real and pressing issues of our time, but who else can command such a worldwide audience?

Today the name Cousteau is a household word. A recent national survey showed that his was one of the ten most easily recognized names in the U.S. Although more recently "discovered" by the general public, sport divers followed his adventures and poetic interpretations of the undersea world for over 25 years.

For divers, the adventure began with the development of the Aqua-Lung demand-valve regulator, and the concept of the "man-fish", a word Cousteau coined to describe a free-swimming diver. These developments occurred in France during the summer

The sea flea submersible is an impressive piece of machinery but divers are still the backbone of Calypso research projects. Raymond Coll (at left, inset), one of the chief sea flea pilots, diving geologist Bob Dill (right) and author Rick Frehsee discuss the upcoming dive.



of 1943. During this period of German occupation, Cousteau and his associates, Frederic Dumas and Phillipe Tailliez, were experimenting with diving apparatus. They knew what they wanted and an industrial engineer, Emile Gagnan, provided the skills to build the device. Actually they didn't have to start from scratch, as Gagnan had been experimenting with a special carburetor that would feed cooking gas to an automobile. With a few adjustments, the Aqua-Lung became a reality.

Although a demand valve regulator had been introduced as early as 1865, the Cousteau/Gagnan invention was timely. Six years earlier another Frenchman had developed rubber foot fins. The first commercial face mask was also available at that same time. Last but not most essential, 1800 psi air bottles had recently become available. The combination of all of these elements allowed for the realization of the "man-fish".

In 1948, the first "Aqua-Lungs" were shipped to the U.S. for sport diving distribution. Rene Buzzoz sold twelve units during that first year. When questioned by the French manufacturer as to how many units could be sold the following year Buzzoz replied "I think that we have saturated the market". Buzzoz's little sporting goods store is well known today as the U.S. Divers Company.

The October 1952 issue of the National Geographic Magazine featured "Fish Men Explore a New World Undersea". An illustrated (51

photos) account of Cousteau's early adventures with the Aqua-Lung. That article introduced this author, who at the time was ten years old, to the excitement and mystery of scuba diving.

Cousteau's first full length book, written in collaboration with Frederic Dumas and with the assistance of James Dugan, a talented American author, was published in this country by Harper and Row in 1953. Since then the *Silent World* has been reprinted dozens of times and translated into eleven languages. During the 50's most diving reps carried copies of the *Silent World* in their brief cases to loan to prospective buyers in sporting goods shops.

The diving "gospel" was heard and seen by thousands more in 1956 when Columbia Pictures Corporations reluctantly took on the American distribution for a full-length motion picture called the *Silent World*. Executives at Columbia were somewhat less than optimistic about the film's potential. Admittedly it was a classic art film that would appeal to all ocean types, but how would it do away from coastal cities?

The *Silent World* premiered in Kalamazoo, Michigan as a two week test for the film's acceptance by the general American public. It played to standing room only crowds for the next couple of years and paved the way for the acceptance of underwater films for the next 20 years. This classic underwater adventure won an award at the

Cannes Film Festival and in the U.S. it won the Academy Award for the best documentary.

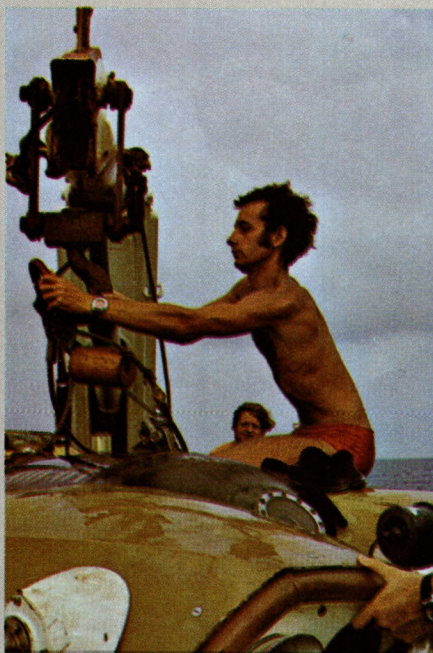
The film was directed by Louis Malle who at the time was an unknown. Today Malle is known as one of the great directors of the French cinema. With an unusual sound track and an original music score this film has lost little of its luster over the years. The opening scene shows the divers of the *Calypso* descending in crystal clear waters with hand-held underwater torches trailing smoke and bubbles behind. The divers descend to the bottom where the team aims underwater lights and cameras. A point of view shot moves from the surface to the bottom and settles again on the crew. Over a sound track of bubbles the film's first words are spoken: "This is a film studio 165' below the sea". It's a scene that rarely fails to produce goose bumps on the flesh of even the most casual observer. The film features shipwrecks, sharks, whales, and dolphins.

Silent World is the most influential and important motion picture in the history of sport diving. No other single occurrence in our sport has influenced so many potential divers.

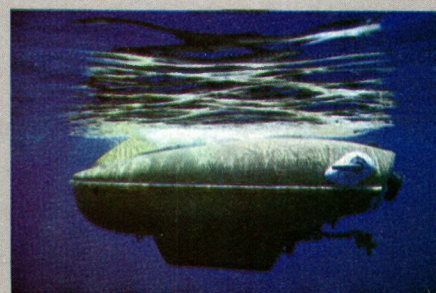
Cousteau's second major book *The Living Sea*, also written with James Dugan, was published by Harper and Row in 1963. It began more or less where the *Silent World* left off and was an excellent sequel.

From 1952 through 1964 the

Captain Cousteau's research vessel, *Calypso*, serves as both home and sea-going laboratory for her crew of 27. A converted mine sweeper, she carries an incredible array of exploratory, diving, and filming equipment. Space is precious, so many of the storage lockers are custom built. The mini-sub or "sea fleas" are handled by a ten-ton hydraulic crane. The "top man", Louie Prezelin, rides



atop the sub as it is lowered and removes the tackle once the flea is below the surface. Built by Sud Aviation, the sea fleas are used for much of the underwater filming, and are outfitted with three 750 watt cine lamps. The flea is a steel sphere covered by fiberglass fairings which streamline it, giving a saucer-like appearance. The vehicles can operate at far greater depths than an unprotected diver, and



National Geographic continued to lend support to Cousteau's expeditions and published photo-stories along the way. After the "fish-men" story in October 1952 came *Fish Men Discover a 2,200 Year Old Greek Ship* in January 1954; *To the Depths of the Sea by Bathyscaphe*, July 1954; *Diving Through an Undersea Avalanche*, April 1955; *Calypso Explores for Underwater Oil*, August 1955; *Exploring Davey Jones's Locker with Calypso*, February 1956; *Calypso Explores an Undersea Canyon*, March 1958; *Diving Saucer takes to the Deep*, April 1960; *Amphitrite, Largest Inflatable Ship*, July 1961; *At Home In The Sea*, April 1964, and the final episode *Working For Weeks On The Sea Floor*, April 1966.

At Home in the Sea was a pictorial account of Cousteau's saturation dive experiments in the Red Sea during 1963. These "Conshelf" or "Pre-continent" experiments which began in 1962 represented the most important events in Cousteau's career since the acquisition of the *Calypso* and the *Silent World* era. It further established his authority and directed him towards more scientific pursuits. His reputation as a marine scientist and oceanographer (titles which Cousteau himself does not claim) undoubtedly were heightened during this period.

Most important, however, were the media events that occurred as a result of the Conshelf experiments. In 1964 Columbia Pictures released

World Without Sun, Cousteau's second major motion picture which brought to the screen the visual poetry of Conshelf II. This film also won the Cannes Film Festival award, and an Oscar in Hollywood. In 1965 *The World Without Sun*, edited by James Dugan, was published in book form by Harper and Row. Conshelf III, a saturation dive in 360 feet of water in the Mediterranean, introduced Phillipe Cousteau as a full fledged oceanaut and photographer. It provided the footage for a one hour television special produced by the National Geographic Society entitled *The Eerie World of Jacques Cousteau*.

From this special, the ABC-TV series of one hour specials *The Undersea World of Jacques Cousteau* began in 1968. From 1968 to 1976 over 30 one hour specials were produced, first by David Wolper Productions then by Metromedia Producers in conjunction with Les Requin Associes, Cousteau's parent production company in France. The TV specials undoubtedly have reached more people with tales of interesting marine creatures and underwater exploration than all other media combined. The re-runs will be seen for years.

Interesting spin-offs from the TV series were eight books published by Doubleday Publishers from 1970-1975 under the series name *The Undersea Discoveries of Jacques Ives Cousteau*, and a 20 volume series published in 1973 by World Publishing Company entitled the

Ocean World of Jacques Cousteau.

More recently the Cousteaus have directed their attention to the Cousteau Society which is responsible for the communication and the development of worthy environmental concerns. The society, which is devoted to the preservation of the world's oceans in particular and improving the quality of human life in general, has grown to over a quarter of a million strong within the first three years of its existence. A \$15.00 membership entitles its members to participation in and information in Society endeavors. A periodic newsletter *The Calypso Log* is mailed to all members. The Cousteau Society can be reached at:

8150 Beverly Blvd.
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My first opportunity to visit with the Cousteau team occurred in 1968 in San Juan, Puerto Rico. At that time a local dive shop informed me that the *Calypso* was due shortly in San Juan Harbor.

A short search produced the *Calypso* and a crew unloading diving saucers and busying themselves with a multitude of routine chores. There were no crowds and some time off in port was well received by the Calypsonians, who were awaiting fresh supplies before returning to the Silver Bank and the filming of the *Sunken Treasure* TV special. This was in the years of the TV specials and the *Calypso* was not

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are lighter and easier to handle than the diving saucers Cousteau used in his earlier expeditions. Propulsion and maneuverability are provided by two side nozzles which rotate 360°. The mechanical arm and claw are used for retrieving objects from the ocean floor. The distinctive uniform of the oceanaut signifies that the diver is a member of a highly organized group among the *Calypso* crew. The yellow packs



conceal four tanks, and the helmets contain diver-diver and diver-surface communications devices. The Cousteaus, more than any others, have brought the visual impact of the deep sea into the life of the non-diving public through their photography. Their investment of time and money in underwater photography is immense; their commitment to the preservation of the sea is even greater.

NAVY DIVER

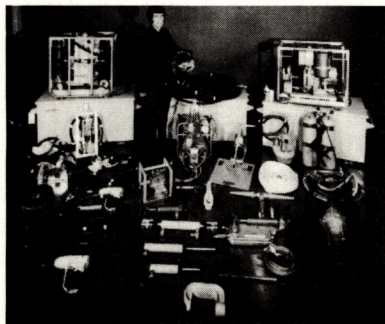
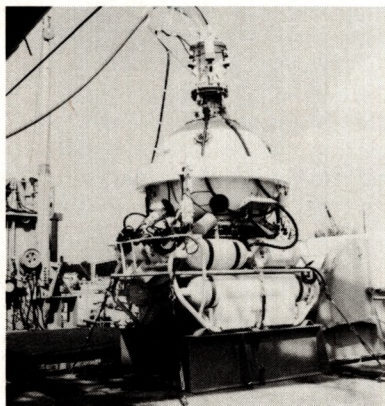
RESEARCH AND DEVELOPMENT

How do you raise a 200 ton object from the ocean floor, change the screws on an aircraft carrier which remains waterborne or work in 1000 feet of water at 32° Fahrenheit? The answers to these problems and a host of others are being researched and tested at the Naval Coastal Systems Laboratory and the Naval Experimental Diving Unit in Panama City, Florida.

Most of the special gear and tools used by Navy divers originate at NCSL and NEDU. Both have been designated by the Navy as the focal points for efforts relative to military diving operations; one for research and development (NCSL) and the other for testing and evaluation (NEDU).

The Laboratory is staffed by 113 military personnel and 646 civilians. Approximately ten per cent of these employees are divers who dive in conjunction with their jobs as research and development specialists. NEDU is staffed by 69 military and 6 civilians.

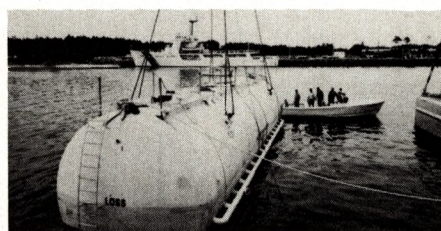
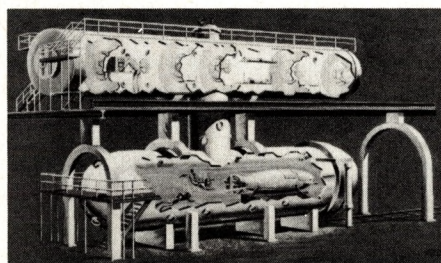
In partnership with the NCSL, the NEDU divers carry out technical evaluations and operational tests of the equipment under development and provide feedback to the NCSL scientists. NCSL and NEDU divers collectively have had research, development, test and evaluation experience with everything from mini submarines to mixed gas



breathing rigs designed to work at 1000 feet.

Most of the problems tackled at NCSL are problems normally encountered by all commercial and sport divers, and as a result, many of the concepts pioneered at NCSL are quickly adopted for use by the diving industry. Removing barnacles and other marine growth from a ship's hull used to require dry docking. However, a device

currently being developed and tested at NCSL which uses ultrasonic (high frequency) sound waves for cleaning might soon permit a diver to clean a ship's hull while the ship remains waterborne. It costs at least \$50,000 to dry dock a 10,000 ton ship, and a ship in dry dock is militarily useless. The ultrasonic cleaner could eventually save considerable money as well as preserve the combat-ready status of



The Naval Coastal Systems Laboratory in Panama City, Florida is the research and development center for the Navy. At left: a vehicle for rescue of trapped submarine crews and a few of the tools used by Navy Divers. The swimmer deliver vehicle (top right) is a small wet sub. Below is a rendering of the Ocean Simulation Facility, showing a test in progress. Bottom right is the lift pontoon of the Large Object Salvage System.

the ship. Anyone who has been given the problem of maintaining the hull of a small boat can quickly perceive the value of such a device to the average boat owner. Some spin-offs from NCSL projects, such as hand-held sonar scanners, seem almost "Buck Rogers-like" to the recreational diver; but others, like wireless long-range diver-to-diver communications, could be used by anyone.

The NCSL together with tenant activities based in Panama City, are able to field quite an array of sophisticated equipment in their quest for new technology. The NCSL owns two hydrospace facilities. The NEDU operates one of these; the giant Ocean Simulation Facility. Using the OSF one can test deep ocean effects on both men and machines in a simulated ocean environment to a depth of 2250 feet.

The facility can recreate almost perfectly the pressure, temperature, salinity, light level, and turbidity of any open ocean environment. Designated a National Resource, the OSF is available to other governmental, educational, and industrial organizations on a not-to-interfere basis for these organizations which meet the necessary signed Defense Department requirements for use of Federal facilities.

In 1978 the Navy Diving and Salvage Training Center will be relocated from Washington, D. C., to Panama City as a tenant activity at NCSL. This relocation of training personnel and the assignment of associated UDT, SEAL, and Navy trained personnel will cause NCSL and its tenants to form collectively one of the largest centers for diving research and training in the world. Aside from the advantages of having most Navy diving activities at one location, the Salvage and Training divers will benefit from working in the Gulf and the fresh waters of Florida. The Anacostia and Potomac Rivers (the current training ground) suffer from abysmal visibility and pollution.

The problems faced at the NCSL range from the mundane to the spectacular, but the effort that goes into finding solutions is always first rate, and the Navy Diver is an integral part of that effort.

COUSTEAU MYSTIQUE

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yet in the eye of the general public, especially in San Juan, Puerto Rico.

A crew member from South Africa, Gary Hasleau, and I became friends and we explored the local haunts in San Juan while comparing notes and shark stories. I was invited to join the crew for meals aboard *Calypso*, and on a couple of occasions joined Madame Cousteau for lunch. Simone, Captain Cousteau's wife, is one of the most fascinating and interesting women I have ever conversed with. She has sailed aboard *Calypso* for many years but prefers to stay out of the limelight and the TV productions.

Two years later I visited *Calypso* for several days on the Great Bahama bank south of Bimini Island. This was during the exploration and filming of the blueholes and caves along the limestone bank. Several times the *Calypso* docked in Miami, but two years had passed and things had changed. They could not have one moment of peace at the Miami dock. Visitors were constant and crowds had to be turned away. Unfortunately the success of the TV series was a two-edged sword. A few of my diving friends who tried to visit reported that they were not well received and found the Cousteau crew to be cold and aloof. They failed to realize the situation. A few months earlier crowds of people boarded the *Calypso* without asking permission in another southeastern U.S. port and had actually tried to carry away anything that wasn't nailed down for souvenirs. The *Calypso* team had become "people shy" in defense and frustration.

In 1976 I participated in a joint project with the Cousteau Society, Florida State University, and the Marine Science department at Miami Dade Community College. We were in the Bahamas to research and film the amazing march of the Spiny Lobster that occurs periodically across the bank. The Cousteaus had recently purchased a sea plane and were operating with their film team from the plane and the rubber Zodiac boats. We were fortunate and secured excellent footage of this very unusual biological phenomenon.

The following story represents a slice of life adventure aboard the *Calypso* during the period of exploration of blueholes on the Bahama Bank.

The water was exceptionally clear even for the Bahamas. Twenty feet below scuba divers wearing special equipment were emerging from a narrow opening in a scrubby coral knoll. Looking more like

creatures from another world they wore yellow headpieces with antennas sprouting from their foreheads. On their backs were large yellow packs accented by black piping. Their jet black wet-suits were trimmed in yellow along the arms and legs.

This equipment is the uniform of the "oceanaut," a member of a highly organized group of divers aboard the *Calypso*, the flagship of the French undersea explorer Captain Jacques Cousteau. For several days the *Calypso* has been plying the waters of the Gulf Stream along the Great Bahama Bank from Bimini to South Cat Cay in search of adventure and scientific discovery. Diving teams have been investigating a shallow blue hole off Cat Cay, while a pair of fabulous mini-submarines search the deep water along the drop-offs for similar formations. Although not working from a formal script, a major objective is to gather film and data on the area to be used in the award-winning television specials, *The Undersea World of Jacques Cousteau*.

Besides its dramatic appearance, the equipment worn by the oceanauts is quite functional. The one-piece backpack serves as a housing for four diving cylinders (one reserve). In addition there is a battery power pack, a compass, emergency signal flares, and an acoustic warning device. A shark stick sheathing a diver's knife snaps to the outside of the pack. Cables run from the pack to earphones in the diver's headgear for communicating with companions above and below the surface. A light mounted in the helmet is used for exploration and photography. The one-piece wet suit is form-fitted and protects the diver from exposure and coral cuts.

Having accomplished their photo mission, the five man diving team emerged from the blue hole and headed back to the ship. Rather than immediately surfacing, they swam along the bottom and stationed themselves beneath *Calypso's* stern, awaiting their turn at the diving ladder. Two were outfitted in the oceanaut uniform, while the remaining three wore conventional scuba equipment. In their hands they carried still and cinema cameras, movie lights and battery packs.

The *Calypso* rested above us; on her black-topped funnel is the insignia of her namesake, a nymph swimming with a porpoise on a field of green. The first impression of this ship is one of size, or rather lack of it. The *Calypso* does not have a silhouette as high as its reputation. A former American minesweeper which was outfitted for oceanography in 1950, she is 142 feet long and 23 feet wide. This is not very large considering a 27 man crew,

and all the gear she carries: equipment for filming and underwater exploration, including the two mini-sub; a large crane; a six-wheeled land vehicle; numerous air compressors; a decompression chamber; a freezing chamber; shark cages; marker buoys; sixteen cine-cameras and thirty sets of scuba gear; not to mention miles of television and movie cable. How does everything fit aboard? Touring the *Calypso* takes several hours, as each step is met with a tricky detail of storage or special arrangement of equipment. When underway much of the heavy gear, such as the mini-sub, can be stored in a special well below deck.

With monitors located throughout the ship, a closed circuit television system both facilitates visual communication with undersea work, and allows topside observers to monitor activity in the ship. Because the *Calypso* works on automatic pilot, it is necessary to have only two men on the bridge, the officer and engineer on watch.

This allows most of the crew to work on filming and reduces the strain on the sixteen divers, who don't have to stand a watch.

There is an immensely knowledgeable crew: photographers; engineers; mechanics; oceanographers; men for whom voyaging is a way of life. They have different faces but somehow they all look alike. Some have heavy beards while others are clean shaven. Long, shaggy hair is popular, but a few wear their hair closely cropped to their heads. They share a copper skin, an oversized watch and an undersized swim suit. The men are dedicated to their task, and often work around the clock at their duties, while never seeming to lose their sense of humor. Their motto seems to be to take life seriously without taking themselves seriously.

There are personalities, but no real "stars" among them. It is not a world of stars but a team that believes in team work — fully knowledgeable that each is helpless without the other — a necessary attitude for those who must work at times under the worst of conditions hundreds of miles from any port.

On the rear deck Raymond Coll relaxed after the noon meal with a glass of wine and talked with Bernard Delmotte. A 16 year veteran with the Cousteau team, he served as an important member of the Conshelf II man-in-the-sea project. At present he is the number one sub pilot and chief diver. Blonde-haired Delmotte is a four year veteran and the number two diver aboard.

Cousteau himself was not aboard. I had asked his whereabouts the day I

boarded. "One cannot be sure," volunteered diver Louis Prezelin. Shrugging his shoulders he smiled and added, "Perhaps he is in Los Angeles or maybe New York or Paris. He spends a lot of time with us, but he is a very busy man. We expect that he will join us in a few days."

Jacques Cousteau has become a legend in his lifetime. For 35 years he has devoted himself to the quest for knowledge and understanding of the undersea world. As co-inventor of the aqua-lung, he opened the door to the silent world for untold thousands of sport divers. His underwater films have delighted millions of armchair-divers and movie-goers and excited scientists who saw the great depths only in their imagination. His Conshelf expeditions have helped to prove that man can inhabit the ocean world and perform useful labor.

Currently the majority of his time is taken up with the organization and supervision of the *Calypso's* current five-year expedition of the world's oceans about which, in cooperation with Metromedia Producers and ABC-TV, he is producing hour-long television specials. In addition, Cousteau also serves as director of the oceanographic museum in Monaco and chairman of the board of U. S. Divers Co. in California.

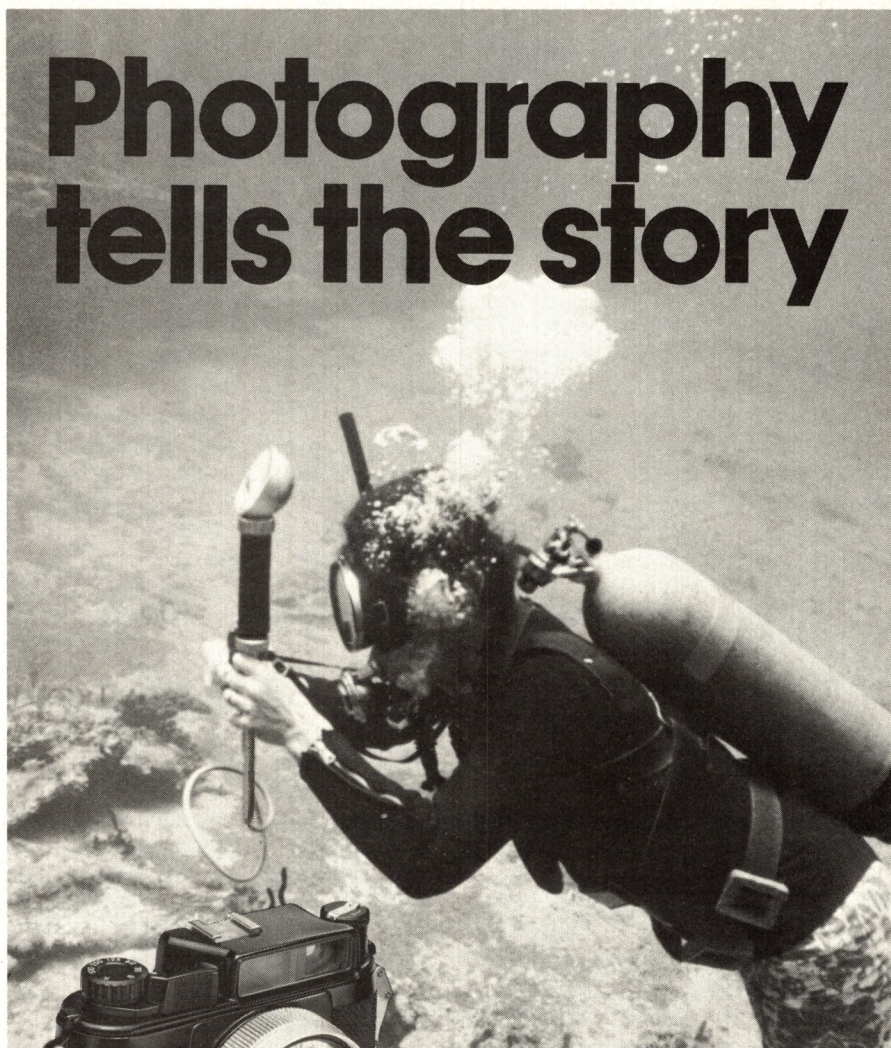
On the diving deck that afternoon preparations were underway to launch the mini-sub. Mechanics made last-minute checks while Raymond Coll discussed the dive with the engineers.

Le "Puce" (The Sea Flea) is one of the most important devices used to film the Cousteau specials. At times it is responsible for the greater percentage of film in a program. They are highly maneuverable and can dive to depths well below the limitations of scuba divers. Designed by engineers at Capt. Cousteau's Office Francais de Recherche's Sous-Marine (OFRS) in Marseilles and assembled at the Sud Aviation Company in Paris, the one-man submarines represent a major breakthrough in underwater science. Although similar to the famed diving saucer described by Cousteau in his books *The Living Sea* and *World Without Sun*, the mini-sub is smaller, lighter, more maneuverable and able to probe far greater depths.

"We have made hundreds of dives with the mini-sub," explained Raymond Coll, "and always we have found strange exciting things. Not so long ago it was generally believed that much of the sea floor was a barren plain devoid of life. We know now that life in the sea exists at all

continued next page

Photography tells the story



And, underwater photography means Nikonos — the only 35mm camera designed for use without a housing at depths to 160 feet (as well as above water).

Here, a diver is using it to secure positive identification of underwater wreckage. Elsewhere, Nikonos-equipped divers are examining off-shore pipe lines, tracing pollution sources, aiding ecological and archaeological studies — each providing the all-important photographic record.

Ruggedly built by Nikon and equipped with famous Nikkor optics for needle-sharp, true-color photographs, the Nikonos III is also surprisingly easy to use. And there's a whole system of Nikonos lenses and accessories to help get you the pictures you need. At Nikon camera dealers and selected dive shops. Or, write for Lit/Pak N-24, Nikon Inc., Garden City, N.Y. 11530. Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada, Anglophoto Ltd. P.Q.) 

Nikonos III

the amphibious camera from Nikon

COUSTEAU MUSTIQUE

continued from page 109

levels. Deep vehicles like these mini-subbs are helping us to understand more about a world we perhaps know less about than the surface of the moon."

The mechanics finished their check and secured the fiberglass fairings to the steel bubble, giving the submarine it's "saucer" appearance. Dominique, the head cinematographer, loaded the two color cine-cameras with fresh film and mounted them in their receptacles in the front cowling. Looking like giant eyes, three 750 watt quartz-iodide lamps, also mounted in the front of the sub, provide the light for undersea filming.

Coll slipped into the back loading hatch. The large rubber "O" ring around the hatch is wiped clean and the cover is screwed tight. Once inside he lies prone on a mattress supported by a tubular frame. Instruments in front of and over his head check on every function of the mini-sub from its attitude to its atmosphere. Four principle portholes, one directly in front of the pilot and three auxiliary ports, are for viewing the depths. As last minute communications checks were made with Coll via radio transmitter, riggers shackled lifting tackle to cleats on top of the hull.

A ten-ton hydraulic crane on the port stern quarter of *Calypso* handles the comings and goings of the mini-sub. Louie Prezelin, acting as "top-man," mounted the top of the sub and the crane gently lifted it over the side. In the water Louie removed the tackle. Pockets of air rumbled out of the fiberglass fairings and the little yellow submarine began shrinking into the deep blue of the Gulf Stream.

Once below the surface the mini-sub was on its own. Jet propulsion, provided by two side nozzles which rotate 360° together or separately, allows the pilot to move the sub in any direction at a speed of about two knots. Fine adjustment in buoyancy and tilt are made by a mercury ballast system. In addition to filming, biological and geological samples can be scooped from the bottom by a mechanical arm and claw.

This particular dive was an exploratory mission, to search for possible blue hole formations along the drop-offs. Coll was down perhaps 20 minutes when trouble developed. Although the mini-sub is designed to bump around on the bottom if necessary, a coral overhang created a few unnerving minutes for the sub pilot. At approximately 300 feet Coll had leveled off and was beginning to film deep sponge formations on the almost vertical shelf. An

overhang, out of view of the pilot, snagged the jet nozzle on the port side of the vehicle and broke it off at the base. With only one nozzle working, it was necessary for him to rotate out from beneath the overhang. Before attempting to surface Coll spotted the broken nozzle on another overhang below, just a few feet beneath him. Skillfully maneuvering the sub in position, he employed the mechanized arm to retrieve it. The sub then limped towards the surface cradling the "broken arm" in its claw.

The *Calypso* was aware that the mini-sub had experienced difficulty, and that Coll had successfully maneuvered to the surface, but scanning the horizon, the submarine was nowhere in sight. Small boat crews were detached and search patterns began. Thinking in terms of the Gulf Stream current, two boats searched ahead of *Calypso* to the north, while a single boat searched south. Searchers communicated via walkie-talkie. About 20 minutes later the mini-sub was spotted about two miles south of *Calypso*. It had been moved in that direction by a phenomena of the Gulf Stream known as reverse eddy. Our boat was first on the scene, and two of us hit the water in a flash. The submarine hung just below the surface at a tilt, it's red and white divers flag protruding from the water. Beneath the sub several black and white pilot fish had taken refuge. I dived below and in front of the main porthole, and could clearly see Raymond Coll's unemotional face gazing back at me. Forming a circle with my thumb and forefinger I asked if he was O.K. He nodded affirmatively. One diver remained there while we sped towards the mother ship. Within minutes *Calypso* had backed down to the distressed mini-sub and cradled her gently back to the deck. Coll jumped from the hatch smiling and described his experiences to us while mechanics busied themselves surveying the damage.

Such happenings are fortunately rare with the mini-subbs. They have proven to be most reliable instruments. However, improvements will constantly be made and these little sea fleas will undoubtedly be ancestors of tomorrow's "go anywhere, do anything" undersea vehicles.

Later that evening I chatted with Louie and Dominique over drinks in a Bimini Bar. The *Calypso* was anchored for the night outside North Bimini and we had taken a couple of the small boats into Alicetown for a little relaxation. The conversation turned to the obvious, of diving and travel. In British Honduras Louie encountered a large shark. It was the largest he had ever seen. Dominique described the tremendous stalactite and

stalagmite formations they filmed in deep water there. In three years the men of the *Calypso* have dived and photographed the world's oceans. Once their work was completed in the Bahamas, they would head back to France.

"What is the future?" I quizzed both of them. "We do not know yet," answered Dominique. "There is talk of a new *Calypso*, a larger ship for our work, and also we know of new submarines in the making." Louie added, "Also plans are underway for an underwater station that will permit our divers to live at the absolute depth limits allowed by helium."

I could see that for the men of the *Calypso* the end of one journey meant the beginning of another.

LETTERS

continued from page 27

Dear Sport Diver,

Recently I had the pleasure in Key West, Florida of viewing your first issue. May I personally congratulate your efforts. It is a pleasure to see your new magazine on the market, and I will look forward to viewing many more.

Vesta Rea-Salisbury
Neptune Equipment Co.
Nashville, Tn.

Dear Sport Diver,

CONGRATULATIONS! Your new magazine is outstanding. I cannot tell you how happy I am that someone has finally come up with a better alternative to SKIN DIVER. As an active NAUI/PADI instructor, I am recommending it to all of my students.

John R. Fletemeyer
Ft. Lauderdale, Fl.

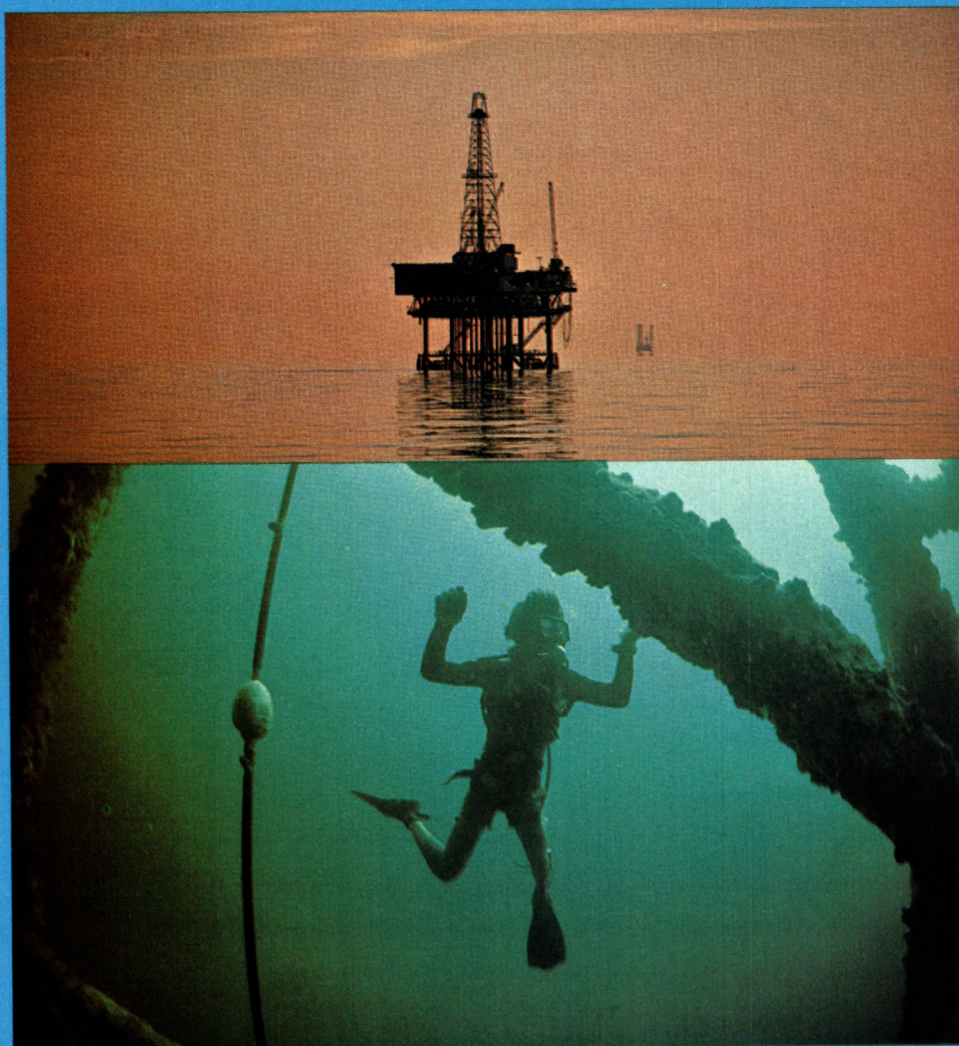
Dear Sport Diver,

I was delighted to latch on to the last copy of your spring issue at the local dive shop, and was even more delighted to discover just how good of a publication you've developed. However, you'll have to top that first issue within the next few months, which won't be easy! At any rate, I was so impressed, my subscription order is enclosed.

The article, "Destruction of a Coral Reef," was a feature that really stood out. Too few divers realize the threat pollution, coral collecting, and marine fish collecting pose to our reefs. And even fewer realize that divers themselves are a threat to the reefs. If only divers would keep a "hands off" policy toward the underwater world, so that it might be enjoyed by more people later.

As vice-president of the Atlanta Aquanauts Society, I'd like to thank you for developing a magazine centering on the needs and interests of the Sport Diver.

Karl W. Shreeves
Atlanta, Ga.



Texas Rig Diving

Article
and photography
by James Creighton

Eye to eye, the barracuda gazes at me from three feet away. He is a large fish, five or six feet in length, slowly sculling his small pectoral fins from side to side to remain motionless in the surge. As he breathes, his

jaws open and close in seeming menace. No need to worry, I think — he's just curious . . . repeat . . . just . . . curious. Suddenly, finished with his inspection, he glides away into the shadow of the rig. A vast shimmering school of small bait fish wisely parts to let

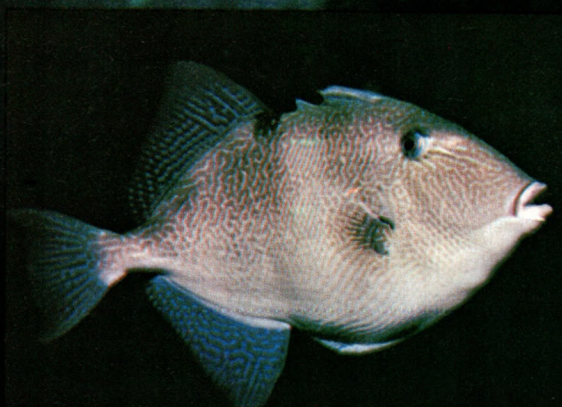
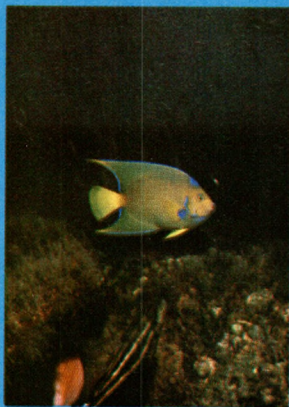
him pass, then closes in behind him. Now I am surrounded by the school, tens of thousands of small, silvery fish, swirling and darting, almost blocking out the sun.

We're diving on A-76, one of over 3000 offshore oil platforms in the Gulf of

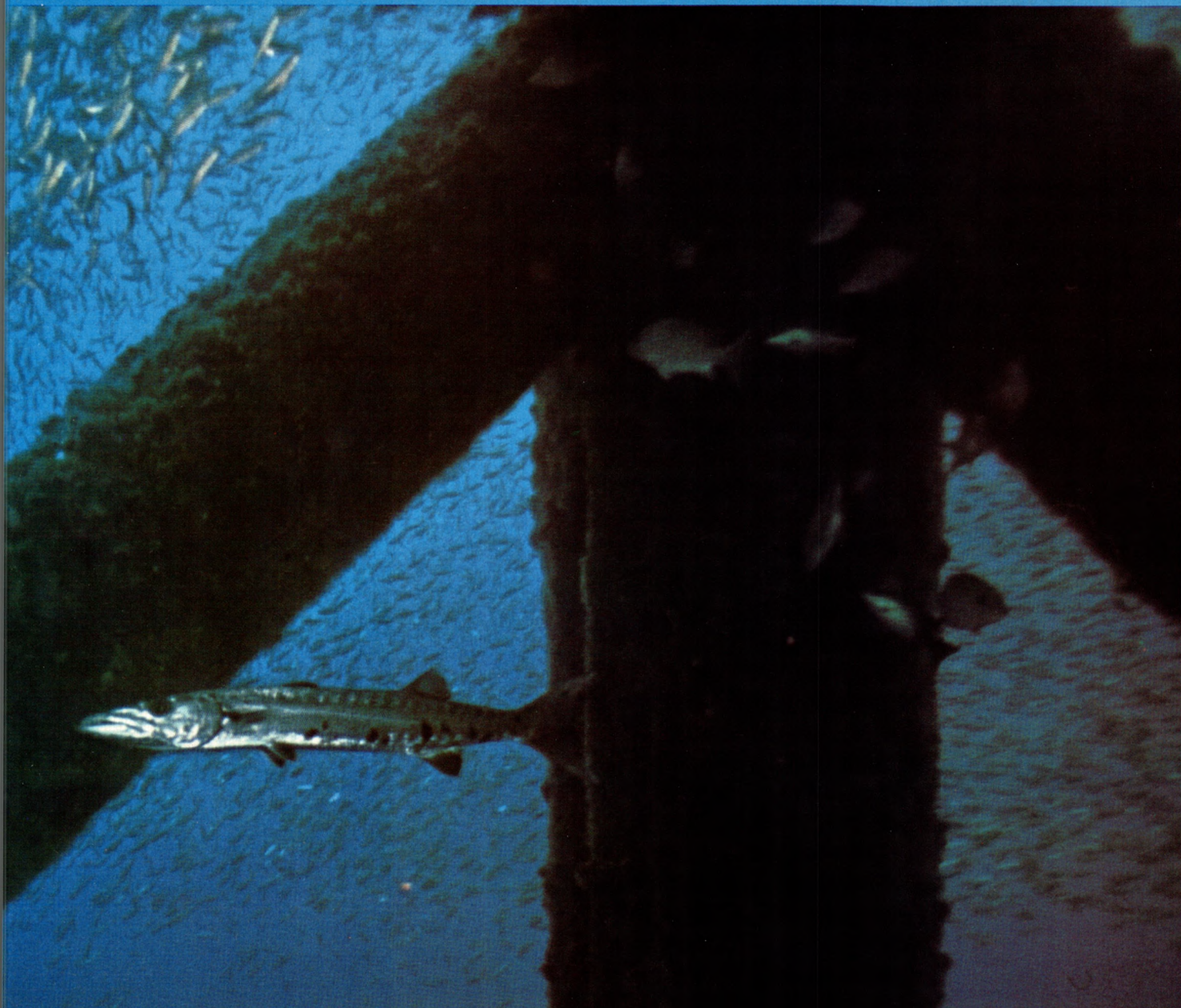
Mexico, and one of many which are accessible from Texas ports. A-76, as it is listed on the charts, stands in 165 feet of water 35 miles east of Port O'Connor, Texas. Called "rings" by divers and fishermen, the offshore platforms dot the coastal waters of Texas and Louisiana. They vary in size from single-legged "stand pipes" to large interconnected multi-platforms. As many as twelve to fifteen or more holes may be drilled from each platform, although rigs which are actively drilling are off limits to divers. Some rigs are placed in water as shallow as 20 feet, while near the edge of the continental shelf some rigs stand in water over 300 feet deep.

The key word about rig diving is FISH; fish in almost unbelievable numbers and great variety. Diving beneath a rig is like diving in a giant aquarium. Concentrated in one area are clouds of small bait fish, large predators, quarter-ton grouper, and brightly colored tropical fish.

The teeming fish life which abounds beneath the rigs contrasts sharply with the drabness and scarcity of life on the open Gulf bottom. The continental shelf of the eastern Gulf of Mexico is a broad, gently sloping plain composed mostly of soft mud, with



The concentration of marine life near the rigs attracts predators like this barracuda. Strangely enough, sharks are rarely seen underneath the platform; some biologists have speculated that they fear entanglement in the lattice-like structure.



Many species normally considered tropical may be found near the rigs. Illuminated by pure strobe light, this brilliant angel fish glows like neon against the drab background of the Gulf bottom. The normally barren Gulf waters seem to come alive around the drilling platforms. The steel-legged reefs are a haven for fish and fishermen alike, a lively oasis in a vast blue void. Constant feeding on the lush growth which covers the rigs produces many jumbo-sized specimens. This has made them the favorite haunt of both spear and sport fishermen along the Southwest coast. As larger creatures vacate their homes, squatters take over the hard-shelled hideaways. This blenny is using a barnacle shell as protection against the many hungry predators. On the platform deck high above the surface, drilling crews carry on the business of extracting oil from the sea bed, oblivious to the activities of the teeming marine life beneath.



**The prolific layer
of life coating the rigs
is the base of a new
food chain.**



scattered patches of sand, shell and clay. Many organisms live in the mud, but most of them are drab in color and sedentary in nature. A diver swimming along the bottom would see starfish and sand dollars creeping through the silt. He might startle an occasional flounder or stingray into flight. He might even catch a glimpse of a burrowing worm or clam. That is, if he could see at all, for there is usually a layer of very murky water five to ten feet thick hugging the Gulf floor even when the water above is clear.

In the open water above the bottom the chances are that a diver wouldn't see much either. The Gulf supports sizeable populations of many open water fish, but it is unlikely that more than a few fish would swim within sight during the dive.

Scattered outcroppings of solid rock do occur in the vast expanse of the shelf. But many of these project only a few feet above the bottom and are usually shrouded in the layer of murk. Others are too deep to dive on.

A few remarkable exceptions to this generally bleak picture of Gulf diving do exist, however. The Flower Gardens coral reefs, 110 miles east of Freeport, and nearby Stetson Bank offer excellent diving. But they are too far from shore to be reached by anything other than large charter boats.

On February 1, 1972, the 572-foot tanker *V. A. Fogg* exploded and sank 45 miles east of Freeport while clearing her tanks of highly explosive benzene residue. In 1976 the *Fogg* was joined on the bottom by 12 surplus liberty ships stripped down

and scuttled by the state of Texas in four clusters, spaced along the coast, to form artificial reefs.

Despite these recent additions to Texas diving, it is the rigs which hold the distinction of being the most common and oldest man-made reefs in the Gulf. The huge pipes which form the rig structure present, on the average, one acre of surface area to the sea. Each offshore platform provides a solid, silt-free habitat projecting above the murk of the Gulf bottom into the rich surface waters. Once in the water the steel legs and cross-members are colonized by a host of organisms, many of them too small to be seen, which need a firm surface to attach to, or they cannot survive; algae, barnacles, sponges, tunicates, small anemones, bryozoans, hydroids, and others. At first the coating of living things is just a thin film, but as the years pass the organisms grow, layer upon layer, forming an encrustation several inches thick.

This prolific layer of life coating the rigs is the base of a new food chain. Small fish feed on the encrusting organisms. The small fish are eaten, in turn, by larger predators who are themselves prey. Some of the fish become permanent inhabitants, others cruise about the area and visit the rig to feed.

Many fish find protection as well as food at the rig. In the crevices and overhangs formed by the intersection of the legs and crossmembers they find safety from predators. This allows many types of fish normally found only on reefs where there is plenty of cover to live on the rig.

Pelagic fish, adapted to living

in the open Gulf, are attracted to the rig as a source of orientation. Accustomed to swimming perpetually in a blue void defined only by the brightness of the surface above, these fish apparently find the rig structure visually reassuring.

The end result of the life-generating and life-attracting nature of the offshore platform is a unique marine environment and a unique experience for the diver. Slip on your fins and dive with me under a typical Texas rig.

Swimming toward the rig on the surface, we meet a mixed school of fish just as the rig becomes visible in the green-blue, 50 foot visibility. Many small jacks, hundreds of spadefish, and a large amberjack are lazily circling the structure. We dive and swim down to the first layer of horizontal cross-members at forty feet. Similar layers occur on most platforms at regular intervals of thirty to fifty feet. These provide a convenient resting place as well as depth reference point.

Wrap your legs around the pipe and look closely at the surface in front of you. Densely packed barnacles are interspersed with patches of purple and orange. Every square inch is covered by growth of some kind, sponge, algae, tiny hydroid colonies. Nowhere is the steel surface of the rig visible. Many of the barnacle shells are empty and little blennies pop in and out of the empty shells and scamper about on the sponge.

In the crevice where the crossmember joins the leg are a variety of creatures. Two small soapfish cower far back in the overhang, flanked by a mean-looking

stone crab and several small multicolored anemones. Several brown and white, three inch long snapper peer around the corner of the leg at us. A foot-long spotted grouper, a coney, rolls his eyes at us, apparently impressed, and swims away down a cross member.

Looking up we see a pair of medium-sized ling swim through the structure. The ling, or cobia, is a common Gulf fish which grows to about five feet and often weighs over 60 pounds. It's highly prized for its delicious white meat. The ling bears an uncanny resemblance to a shark in its body shape, coloration, and swimming motion. Many divers have confused the two.

Even though they are plentiful in the Gulf, sharks are seldom seen inside the rigs. In view of the fact that many rig divers spearfish, this is remarkable. Some divers attribute this to an instinctive fear of entanglement in the structure on the part of the sharks, but no one really knows. There are exceptions to every rule and sharks have been seen swimming right through platforms, but this is rare.

Swimming toward the center of the rig we are surprised to see the bright colors of two spotfin butterflyfish gliding in and out of a "centralizer", a large steel ring which once guided drill pipe to the bottom. Tropical fish are not uncommon at these rigs and at some of the deeper water platforms, many species are year round inhabitants. Resident species include butterflyfish, queen angels, small, brilliantly colored damselfish, and an occasional squirrelfish.

Sit still for a moment and the spadefish, in a trusting gesture, will first tug on your hair, then brush up against your fins, your legs, your arms, apparently in an attempt to rid themselves of skin parasites. Besides the many spadefish cruising about slowly beneath the rig, there are numerous triggerfish and sheepshead swimming within the structure, pausing now and then to nibble on the rig surface. With their powerful teeth these fish crush and eat barnacles. The triggerfish can even demolish one of the numerous short-spined sea urchins.

Exhale and sink along one of the legs toward the bottom, forty feet below. In the noticeably dimmer light several small red snapper swim up to look at us. If we are patient, and

lucky, we might see several large snapper in the 50 to 20 pound class mixed in with the smaller fish. Dog snapper to 90 pounds have been taken at the rigs. At 60 feet, ten feet off the bottom, we are just above the murk layer.

Feeling brave, we descend into the dark water. The visibility is two feet at best and it is very dark. The water is noticeably cooler. Keeping a good grip of the leg of the rig we grope for the bottom with our fins and sink several inches into the half liquid mud. We proceed along a horizontal crossmember a few feet above the bottom.

Suddenly, a dark shape, three feet long, materializes out of the murk. Breathing faster, I hold my ground and peer closer. The dark shape moves a few inches nearer and returns my stare with two bulbous eyes — a small jewfish! We sit still for a moment, he rolls his eyes from me to you and back again several times. He opens his mouth very wide, almost as if yawning, then closes it quickly with a whoosh of water through his gills. Suddenly he's gone, retreating back into the murk.

Jewfish and warsaw grouper often lurk near the bottom of the structure. Occasionally they rise to the surface of the murk and look around for a moment, then sink back into the gloom. Warsaw grow to well over 100 pounds and Jewfish reach 500-600 pounds. An encounter with one of the quarter-ton monsters in the murk would be truly exciting. Although they are usually nonaggressive and are not generally considered dangerous, their size commands respect.

But our air is low and we must swim back up the rig leg toward the surface and find the corner of the platform at which our boat is located. We surface several yards away from the rig to avoid being thrown into any near-surface crossmembers by the surge.

Around the base of many rigs a sizeable amount of rubble has accumulated which acts as a haven for many creatures normally found only in the nooks and crannies of coral reefs or rocky bottoms. This rubble consists of sections of pipe and cable dropped from the rig, old tires, fishing poles, and outboard motors donated by the sport fishing fleet. Some rigs have a pad of crushed oyster shells or rock rubble,

dumped at their base to prevent erosion around the legs. On the occasional days when the water is clear all the way to the bottom this rubble is revealed to be the home of many types of creatures. In addition to the usual blennies there are toadfish, scorpion fish, and a variety of crabs. Octopus, though very shy, are sometimes seen.

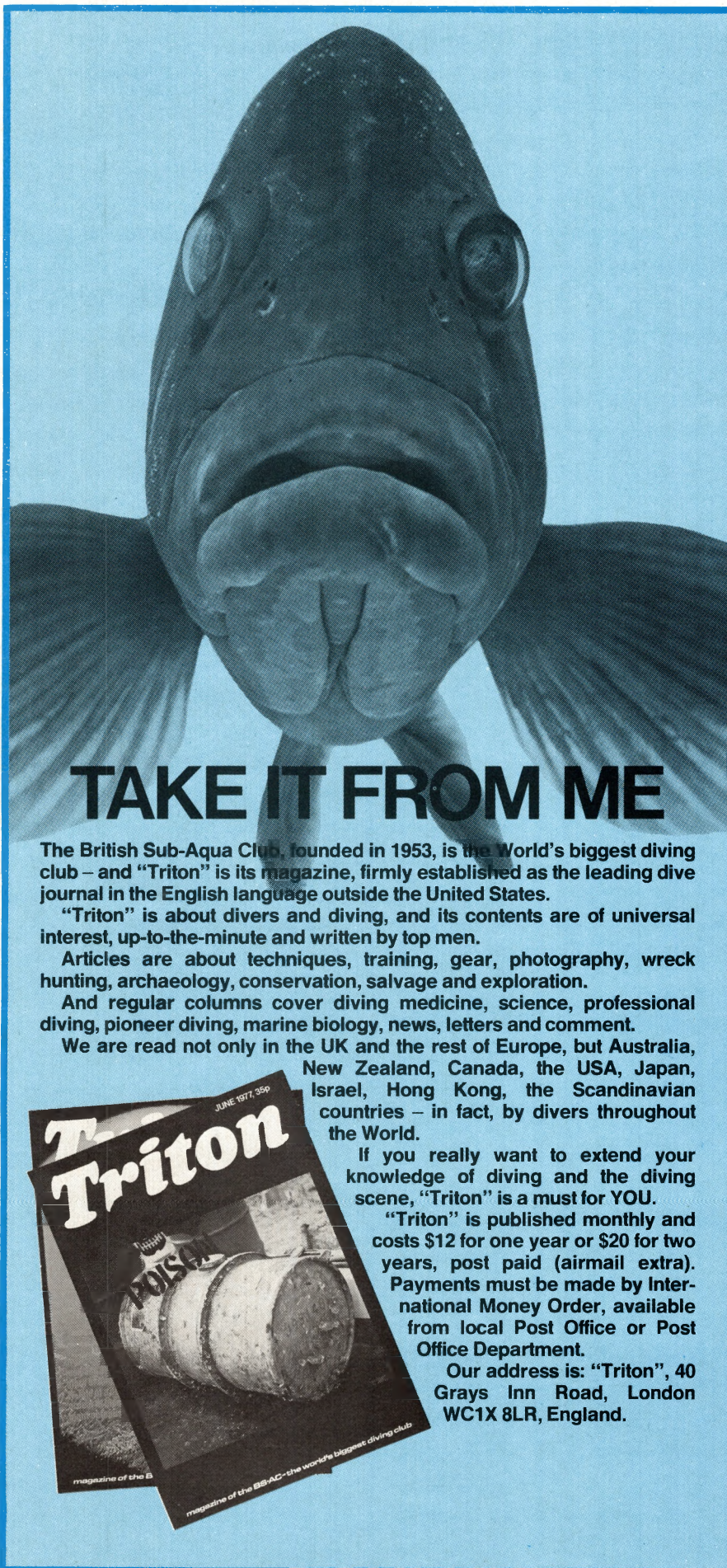
In the past most rig divers were spearfishermen. Many still are. The prolific fish life nourished and attracted by the rig provides some of the best spearfishing in the world. But more and more divers are discovering that the dense fish populations and clear water also make rigs good places to take pictures or just fish-watch.

The summer and early fall months are the best times to go rig diving. Visibility is at its best then, and the Gulf is usually cooperative. Good possibilities for Gulf trips also exist in the spring, but many days are lost to high winds and rough seas. In the late fall and winter, pickings are slim. Only a few good diving days are scattered between cold fronts. Visibility is reduced by the days of high winds and rough seas which stir up the soft bottom. After heavy rains on the Texas coastal plain a curious layering of the water occurs. The silt-laden fresh water washing down the rivers and through the bays spreads out over the denser salt water of the Gulf. The result is a layer of poor visibility at the surface with better visibility 10 to 20 feet underwater.

Visibility also varies greatly with depth. Generally, the greater the depth in which a rig is placed, the clearer the water will be. Rigs in over 100 feet of water rarely have water clarity less than 30 feet, and in the summer 60 to 70 foot visibility is common. Rigs in 50 to 70 feet of water have a visibility of 25 to 100 feet in the summer, although very clear days are rare.

Good diving days are within a few hours running time from almost any Texas port. To the east of Sabine Pass, near Port Arthur, there are several groups of rigs in 50 to 70 feet of water. From Galveston most divers head for the Buccaneer rig group 30 miles to the south in 70 feet of water, or to a rig group 35 miles east of the jetties. Forty to fifty miles south of Freeport there are several rigs in 90 to 110 feet of water which

continued page 127



TAKE IT FROM ME

The British Sub-Aqua Club, founded in 1953, is the World's biggest diving club – and "Triton" is its magazine, firmly established as the leading dive journal in the English language outside the United States.

"Triton" is about divers and diving, and its contents are of universal interest, up-to-the-minute and written by top men.

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PIRATES DIVE FOR CHARITY

by Pat Kelley

The most exciting public event ever associated with scuba diving is being sponsored by the newly-formed Blue Fathom Underwater Safari Club in Fullerton, California.

The club, which was established in May of this year, arose from the common need of many divers in the North Orange County area who could not always find a compatible buddy when they wanted to go diving, and has snowballed into a vigorous group of 47 members. The idea for the Treasure Hunt came about from a desire on the part of the clubmembers to see the Blue Fathom Underwater Safari Club evolve into more than just another organization of serious-minded sport divers, and to see it do something for someone less fortunate. The thought of a dive for charity seemed a natural. The plan was checked out by an attorney/club-member, and what was at first only a vague plan has now become a reality...a Treasure Hunt with a cash prize of \$3,000 to the lucky diver who solves the riddle and finds the treasure.

The format of the Treasure Hunt is essentially a simple one. Somewhere along the approximately 40 miles of coastline of Los Angeles and Orange Counties, in three fathoms or less of water, lies half of an enlarged replica of a golden Doubloon. The other half of the Doubloon will be kept in a safety deposit box until the matching piece is found. The treasure map and the initial set of clues (in the form of a poem/riddle) will be purchased by the participants, and additional clues will be published weekly until the treasure is found. Any diver who solves the riddle and locates the missing half of the Doubloon find himself or herself \$3,000 richer, and a check for all proceeds earned by the club from the sale of the treasure map and clues will be presented to a charity.

Prior to the opening of the Treasure Hunt, the entire \$3,000 cash prize will be placed in escrow in the Bank of America, and the second half of the Doubloon, along with the exact location of the treasure will be placed in a sealed safety deposit box.

To date, monies toward the cash prize have come from companies such as Aqua Lung Center, Inc., U.S. Diver, Inc., and James Mock, Inc., as well as from several private individuals. Many other sources have been or will be approached, and a full listing of all donors not wishing to

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PIRATE OF
POVERTY**

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FOR CHARITY**

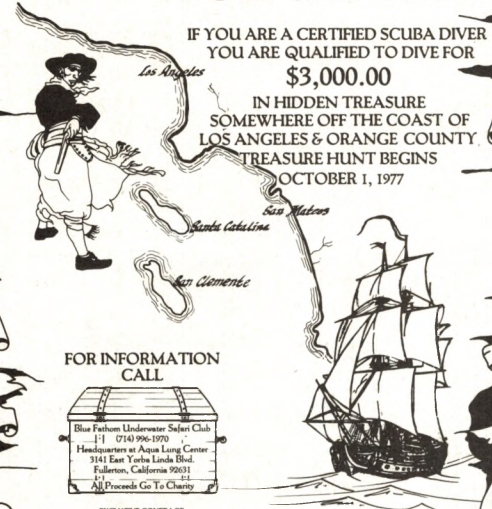
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Fullerton, California 92631
All Proceeds Go To Charity

EXCLUSIVE COVERAGE
by
Sport Diver Magazine



remain anonymous will be made public during the Treasure Hunt, and each of those donors will be given full recognition at the time of the presentation of the cash prize and the donation to charity.

Neither the members of the Blue Fathom Underwater Safari Club nor their immediate families will be eligible to dive for the treasure. Only three people will know the location of the treasure, or will be involved in its placement in the selected spot, and none of the other members will know the identity of these three "mystery members" until after the treasure has been claimed.

A few basic requirements have been established by the club, primarily in the interest of safety. A form has been prepared which must be read and signed by each diver before the package of clues and the treasure map can be purchased, stating, among other things, that he or she is familiar with and will abide by the basic safety rules and practices established by the major certifying organizations.

The basic ground rules and the need for caution and common sense are outlined in the first seven stanzas of the poem/riddle of clues. The first is, of course, the most basic of safety practices—always dive with a buddy. Secondly, it is made clear that it will not be necessary to go onto private property to find the prize, and third, that nothing will have to be destroyed or damaged in any way to locate or to retrieve the treasure. The club stresses that the treasure will be hidden in a popular, non-hazardous diving area within the boundaries outlines.

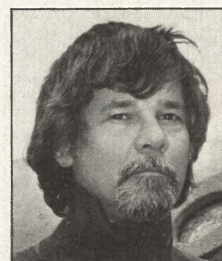
The Treasure Hunt will have its kick off in grand style on October 1, 1977, at the Aqua Lung Center, 3141 East Yorba Linda Boulevard in Fullerton,

continued page 118

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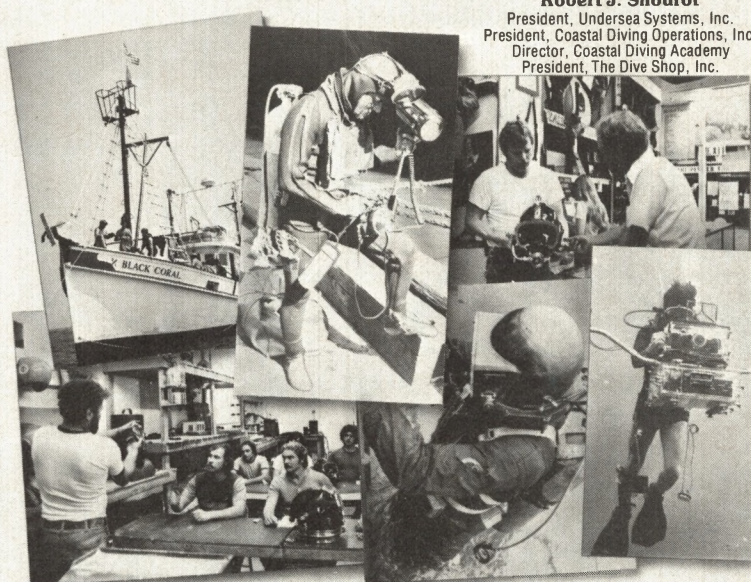
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sign the club's form. Then, for \$5.00, you can purchase the package containing the map and the first clues. Since the club is limiting itself to a very strict budget for publicity and expenses, and since it has been fortunate enough to be able to draw heavily on the talents of its members as photographers, artists, writers, etc., you can be sure that almost *all* of your \$5.00 entry fee will go to the charity chosen. Additional clues will be published weekly until the treasure is found.

When the half-Doubloon is turned in by some lucky diver, and is matched to the half in the safety deposit box, the winner will draw the name of a charity from a list submitted by the members of the Blue Fathom Underwater Safari Club, and that charity will be the recipient of a check for all proceeds earned from the Treasure Hunt.

The presentation of the money to the winner and to the charity drawn will be made a gala club-sponsored event to which all registered participants, along with the media will be invited.

Won't you join the Blue Fathom Underwater Safari Club in its battle to Fight the Pirate of Poverty, and make this first annual Dive for Charity with us?

continued from page 117

California, headquarters of the Blue Fathom Underwater Safari Club, when the doors open at 8:00 A.M., and the first packages of maps and clues go on sale. Miss U.S. Army 1977, will be there to wish

everyone luck. Full media coverage is expected from radio, television and newspapers.

In order to register (and you must be registered to claim the prize) you must show proof of certification, and read and

BLACK CORAL

continued from page 96

poor to fair, while others are good to excellent. Those with thick bases an inch or more in diameter are prize trophies, suitable for rings. Black coral, like ivory and jade, is sold according to quality, size, and demand.

Man's use of black coral for jewelry dates back thousands of years. According to some historians, the Arabic word *ramoth*, translated as coral in the English version of the Bible, probably meant black coral. There seems to be no doubt that some type of horny axis of a marine organism was used form very early times as an ornament or talisman because of the magical properties attributed to it. The Greeks used a substance, believed to have been black coral, as an antidote for scorpion stings and for other medicinal purposes. They named it *antipatheria*, which means *against disease*. Some primitive tribes carved it and wore it as jewelry, believing it would protect the wearer from evil spirits.

The word *antipathes* has been handed down to us from the Greeks and Romans. Pliny and Solinus coined *antipathes* as the name of one of the "flexible corals with a black horny axis". The substance called *chartioblepharm*, mentioned by Pliny as a particularly efficacious love charm, was probably some kind of black coral.

Black coral from the Red sea was prized by India's ruling priests, who carved it into ceremonial jewelry. They also made scepters out of it that were carried by kings and princes. Because of this it was called "king's coral".

Rare and unusual, black coral is becoming more popular as people learn more about it. As popularity increases, so the danger of depletion and extinction increases. Thanks to the work of scientists like Dr. Grigg, efforts are now underway to conserve the resource, and to preserve this beautiful organism as an important part of our seascape.



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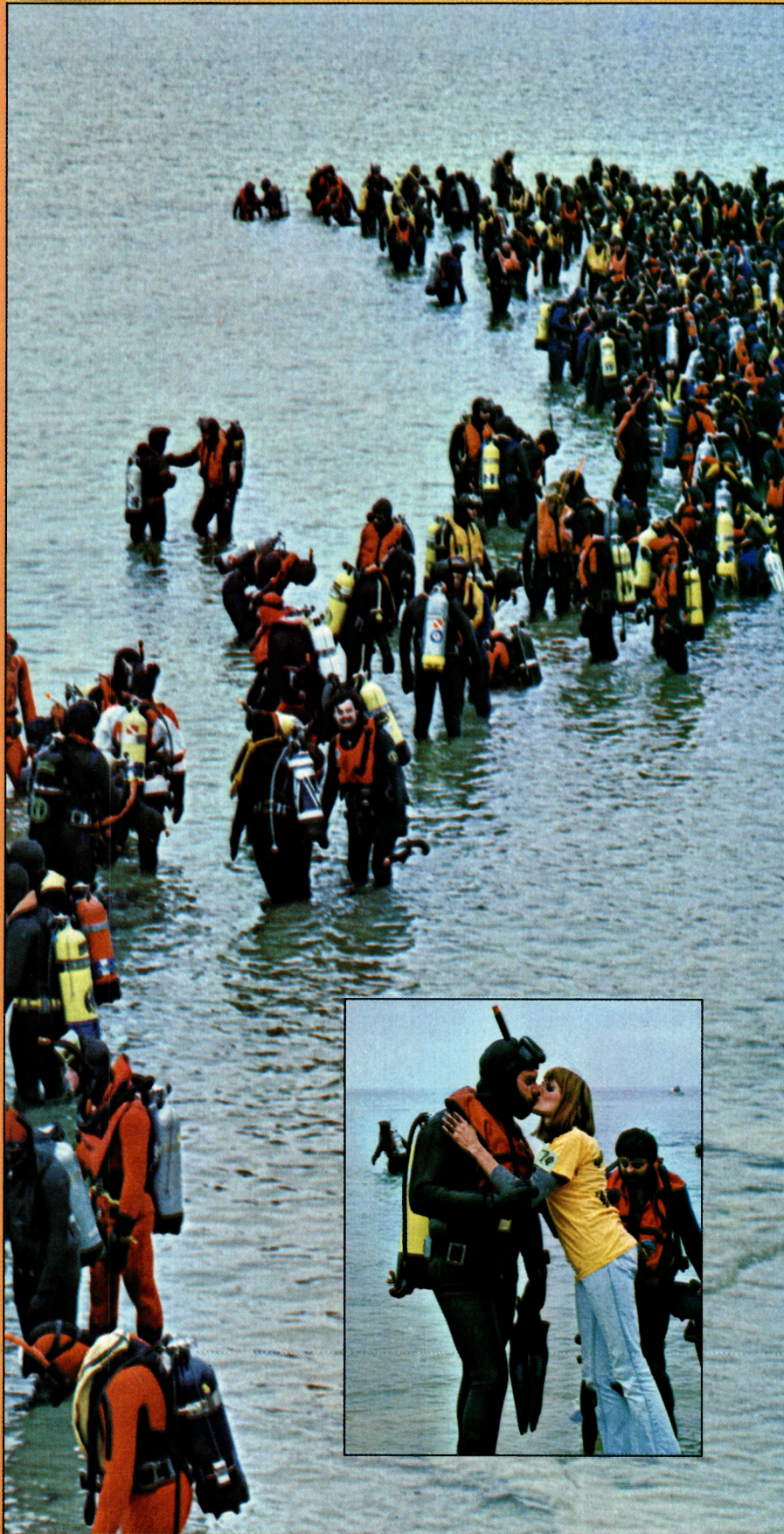
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Treasure Hunt 77

Steve Blount



Dive for sunken treasure in Canada? That's right, Florida and the Caribbean may have shoals of Spanish Galleons, but every year thousands of people gather at Presquile Provincial Park on Lake Ontario to watch as scuba enthusiasts dive for the kind of treasure everyone dreams of.

Each year since 1971 Joe and Carol Caputo, of Sub-Mariner's Diving Equipment in Toronto, have organized a Treasure Hunt to titilate, congregate, aggravate, but mostly to entertain, divers.

"I can remember the first time we mentioned having this function in 1971," Joe says. "At that time it seemed nobody was really interested in what happened to the divers that were trained except a few small clubs who really were trying their best to keep them active. So with this in mind, a Treasure Hunt was born, to look after the novice diver as well as the ardent and more experienced."

Joe and Carol, along with Glen and Anne Roberts and a host of helpers, work all year making arrangements and collecting prizes for the Treasure Hunt. The prizes are donated by manufacturers, retail dive shops, dive resorts, clubs and individuals; ranging from boobie prizes like keychains to week-long vacations at exclusive Caribbean resorts.

For the divers, Treasure Hunt fever takes hold Friday night as scuba fans arrive at the Park with children, friends and dogs. They begin setting up camp, renewing old acquaintances, drinking O'Keefe beer, partying in to the wee hours and...

Saturday night there's a big get acquainted dinner and dance at the Canadian Legion Hall in Brighton, about ten miles from the Park. The

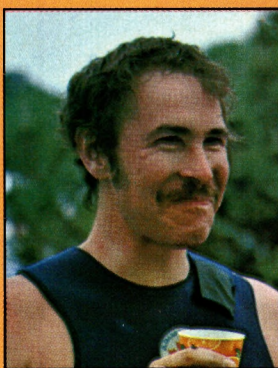


Ladies' Auxiliary whips up tubs and tubs of delicious home-cooked food, and after the dinner settles a bit, the bar swings into high gear, putting out as much of anything as anyone cares to drink. The lights go way down and Brian Remington does an instant replay of his yearly d.j. act. The best music of several eras soon has the sweating, fever-crazed herd on its feet and writhing to the sounds. In the basement game room shell-shocked Legionnaires and dart players gaze apprehensively at the dance floor overhead and try to ignore the thunderous thrumming from above.

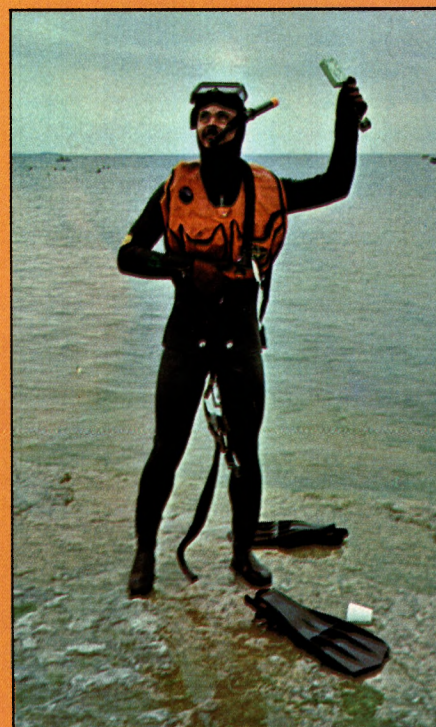
Upstairs, the crowd suddenly parts and dancers gape as a bare-butt streaker flashes by, grinning from cheek to cheek. The solitary figure is followed by another, and then another solo act, and finally the first two come back for a dual streak. The fourth time around no one is surprised, but they still get a cheer from the crowd. Halfway across the female of the pair slows down to a trot, winded. Everyone applauds and another round is poured. Round follows round and the music gradually winds down as the crowd filters, finding their way out to entrain to the motels or the park.

Sunday is Dive Day. By noon, Gary Greenberg's rescue boats and those of TAM Dive, LaSalle Rescue, and others have been in the water for over six hours. There are four aboard each boat: two rescue divers, a driver, and a radio operator from the GRS radio club. During the six Hunts which have been held to date, there have been no major accidents.

As dive time nears, the tempo increases. A starting time of 1:15 p.m. is announced and the divers begin to suit up. Heavy wet suits are a



The divers are not only ready, but even seem anxious, pressing forward into the frigid 40° waters of Lake Ontario as they await the start signal (opposite page). Finding a flag sometimes entitles the participants to a lot more than just a shot at the prizes (inset). A happy diver, Carol Caputo, and Tom McCollum are three elements of a successful Treasure Hunt (top left, middle, and right). Carol and her husband, Joe, have been organizing this event for six years; gathering prizes and attending to the thousands of details to ensure the enjoyment and safety of their guests. Tom McCollum and Gary Greenberg (middle left) donate their time and skills to assure there are no accidents. Two divers scout the lake beach where the Hunt will take place to give themselves every chance to wind up like the successful man at right.



Photography by Steve Blount
and Wayne Phipps

must, as the water temperature in Lake Ontario hovers in the mid-40's. No one seems to mind though. Most divers rush right to the water as soon as they're suited up, Gary Greenberg sloshes about clad in a work shirt, plaid cut-offs, and wet suit boots.

As Joe Caputo mounts the scaffold, divers are lined up ten deep all along the 600 foot shore line of the dive site. The frontmost rank stands waist deep, awaiting the start signal. Glen Roberts lights four "Thunder and Rainbow" fireworks cannisters, and with a cloud of smoke, they're off! Like lemmings, the divers press forward from the shore, until 1091 fins (one diver has only one leg) are churning the surface of Lake Ontario.

The divers are looking for small, weighted markers with numbers on

them. Finding one of the 364 markers in a roped off area might seem like a piece of cake to divers accustomed to diving in the Caribbean or in fresh-water springs, with their 200 foot + visibility, but in Lake Ontario the average visibility is five to seven feet. Also the flags are painted light green, blending perfectly with the water.

In minutes a team is bounding towards shore, waving a flag and yelling as loudly as mask and regulator allow. They get the prize for the first team out of the water. Suddenly, an emergency call is relayed. A diver is on the surface giving the distress signal. In seconds he's in a boat belching up lake water. Seems the diaphragm in his new regulator ruptured and he inhaled several quarts of Lake Ontario.

As the teams come in they are registered; the successful divers in one line and the unsuccessful in another. A running head count is kept as to how many divers are still in the water, and when they're all reported in, the prize draw begins.

"It's time to start the draw." Joe announces. "Now about two thirds of you are going to win something. The rest of you turkeys are going to go home disappointed, but that's the way it goes."

It starts with prizes for the teams who couldn't find a flag; small liquor bottles and trinkets. All of the prizes are given in pairs, with both buddies getting the same thing. As they get into the real prizes, winners parade endlessly before the table, collecting fins, tanks, BC's, knives,



compasses, camera housings, and other items that are part of the almost \$10,000 worth of prizes up for grabs.

Tension mounts as the drawing gets into bigger and bigger prizes, and then suddenly, they're giving away a diving vacation at Ichetucknee Springs in Florida, then a trip to Andros Island in the Bahamas. It's time for the biggie. Everyone is quiet, in anticipation. Carl Strassburger of Aquaventures, the donor of the top prize, has his daughter draw the number. The number is drawn and the names announced, but there are no screams of excitement, no one responds. The divers who've won have gone home. After three calls, they draw again, and this time Don Brambley and Steve War-

wick run to the front and begin hugging everything in sight. Visions of the week in Negril, Jamaica they've just won are visible in their eyes. The winners are happy, Carl Strassburger is happy, at least two thirds of the crowd is happy, and Joe and Carol Caputo, well they're happy that tonight they can go home and forget about the Treasure Hunt until tomorrow, when they start the planning for Treasure Hunt '78.

Treasure Hunt 78



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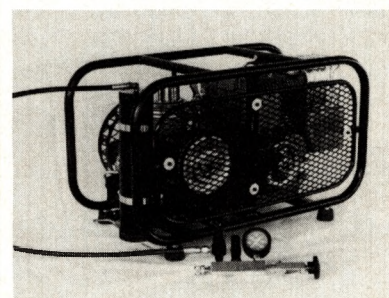
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sors-Wind surfers-Boats, Sailboat
Rentals and Charters. 13258 W.
Bayshore Dr., Traverse City, Mich.
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Club Scuba, Inc.
#1 1300 E. Wayzata Blvd., Wayzata, MN
55391 (612) 473-4266
#2 2280 Maplewood Dr., Maplewood,
MN 55109 (612) 484-7252

Inter-Space U.W. Photos
Lake Superior Charters, 6060 5th St.,
N.E., Minneapolis, MN 55432
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Scubapro-Bayley-Watergill Atpac-
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08817 (201) 985-2206

The Diver's Den
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Tennessee 37204 (315) 383-8565

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Repairs-Testing-Instruction. RFD 2, Box
211, Charlottesville, Va. 22901
(804) 296-1319

FLORIDA'S SPRING DIVING COUNTRY.

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Alexander, Juniper, Silver Glen, and Salt Springs are located in the Ocala National Forest. All provide hours of underwater fun for the snorkeler.

These are only a few of Florida's many springs and sinks that are open to divers. For those who are planning a trip to Florida's spring diving country the book *Diving Guide to Underwater Florida* is recommended. It contains the most complete and up-to-date information available on spring diving with maps, directions, and descriptions of nearly 100 of the best spring and sink dives in the state. The guide can be ordered for \$3.95 plus \$.50 for handling from New World Publications, 6043 Greenberry Lane, Jacksonville, Florida 32211, or at your local dive shop.

Many divers are now planning their Florida diving vacations so that they will be able to stop off in Spring Country on their way to south Florida and the Keys for reef diving. It is almost like having two vacations in one and will greatly add to the adventure of your Florida holiday. There are also plenty of open areas and ledges to explore. Unfortunately this area is not always open to the public. It would be advisable to check with one of the local dive shops about their accessibility.

Ichetucknee Springs, ten miles west of Branford, is one of Florida's true delights. Two large head springs feed a crystal clear run that winds over five miles through virgin woodland to the Santa Fe River. The state now owns and operates as a park the springs and over three miles of their run to the bridge on US 27. Although most visitors to the park float down the run on old tubes and rubber rafts, divers enjoy snorkeling the run, studying the underwater beauty, and searching the sands for fossils and relics.

HAITI

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When asked to compare the two areas he replies "The water is warmer, the Gulf provides shelter for calm diving, and it's filled with plankton which supports an incredible marine life."

Alan brought his well-equipped shop with him: 50 aluminum 80 tanks, close to 30 sets of other necessary gear, two Innerspace compressors, a 15 cfm and a 7½ cfm, a 34-foot Anacapi diesel inboard, a 20 foot open fiberglass outboard, and a 20 foot Mk5 Zodiac. The shop is able to move up to 30 divers at one time, and in addition is the only PADI training facility, and the sole distributor for Scubapro and U.S. Divers. Alan and Eva, who is also a divemaster/instructor, work together to give their visitors as much diving as necessary to satisfy them. Both are extremely confident divers who spend much of their free time diving, exploring the unique waters around their new home.

Looking west along the coast, the sight of the mountain plunging into the sea stirs the imagination. What will this dive be like? A quick five minute boat ride later and we were finding out just that. Not more than 50 feet from the shore the mountain falls further into the Gulf, sometimes at a sloping angle, sometimes like a cliff. It is a wall dive, starting as shallow as 30 feet. The wall harbors many of the same inhabitants as the northeast Gulf, the sponges, fans, and fish, and although there aren't extensive forests of black coral here, the visibility is rarely less than 75 feet. Looking down the edge of the wall you can see its ragged boulders for a hundred feet or more. Even with its miles and miles of mountainous coast, Taino does have a large number of healthy semi-barrier reefs; elkhorn, staghorn, fire, and brain corals massed together forming a protective shield for the species that live inside its wall.

Because of the vast number of dive sites, it is virtually impossible to describe and name each one; many have only recently been discovered. The diving at Taino is excellent, just as it is at Kyona. Both resorts are well staffed, serve delicious meals, and are kept clean.

There are many spots in the Caribbean where divers can find tropical fish, brilliant sponges, and clear water. But, if you want to experience night clubs, casinos, good diving, an uncommercial atmosphere, and vaudou dances, Haiti is the only place to be.

Taino Beach Information:
VIP Hotel Reps, Inc.,
1725 K St., N.W., Suite 705,
Washington, D.C. 20006
For Reservation only, call collect
202/785-8113

Poseidon Ventures Tours
363 San Miguel Dr., Suite D,
Newport Beach, Ca. 92660
714/644-5373

Kyona Beach Information:
Oceaneer Dive Tours,
5555 Hollywood Blvd.,
Hollywood, Fl. 33021
Toll Free: 1-800-327-3810
In Florida: 305/983-0017

Air France (direct from Miami)
321 S.E. 2nd St., Miami, Fl. 33131
1-800-221-2110
except New York State

American Airlines (direct from New York)
633 3rd Ave., New York City, N.Y.



Texas Rig Diving

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are often very clear. Perhaps the best rig diving off the Texas coast is underneath A-76, 35 miles southeast of Port O'Connor. The bottom here is at 165 feet and the water is usually very clear. Tropical fish are year round inhabitants on this rig. Just two to seven miles off the beach at the northern end of Padre Island, near Corpus Christie, are two groups of rigs in 50 to 65 feet of water. Divers can reach these rigs by running south parallel to the coast from Port Arkansas, or by launching through the surf. The search for offshore oil and gas continues in the Gulf and each year new rigs go up along the Texas coast.

Most dive shops in cities along the coast run rig trips or can put you in touch with boats that do. Many of the boats taking divers out to the rigs are small, privately-owned vessels, chartered on a break-even basis. Dive shops as well as dive clubs can help you to get in touch with the owners. There are several diving charter boats along the coast which run rig trips as well as trips to the artificial reefs and the Flower Gardens. Most notable of these is the *Silver King II*, a 65-foot, compressor equipped, dive boat operated out of Sabine Pass by veteran Gulf diver, Captain A. E. Blood.

Although the rigs cannot really compete with the Caribbean in terms of sheer scenic beauty, few natural reefs harbor such abundant fish life. Beneath the offshore platforms is a unique marine environment with a character all its own, its own risks, and its own special type of excitement.

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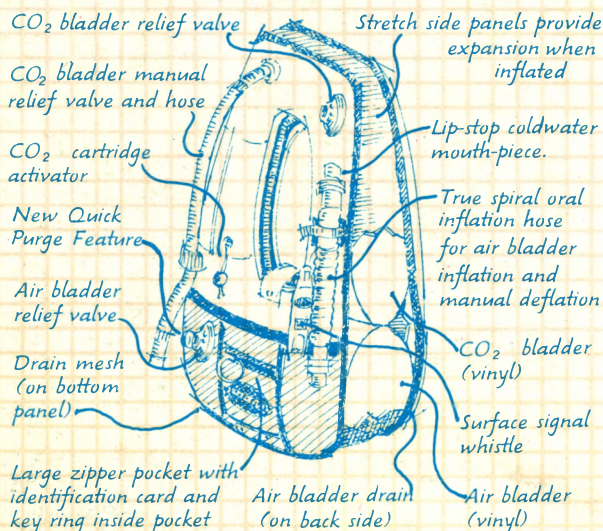
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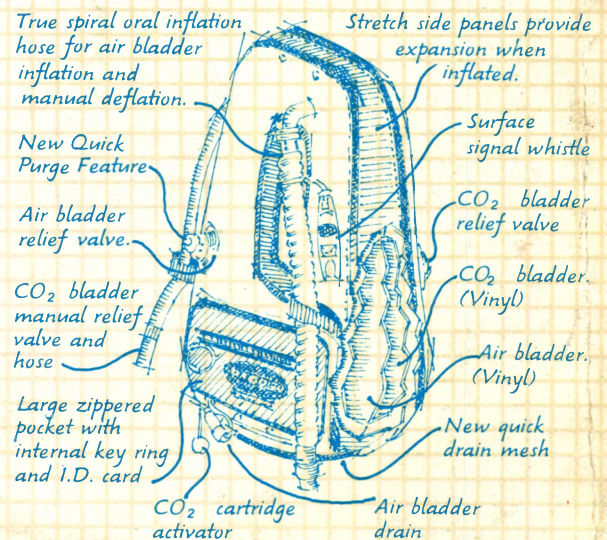
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